Chemical Age

CHEMICALS AND FREE TRADE (page 967)

VOL. 78 NO. 2005

14 December 1957

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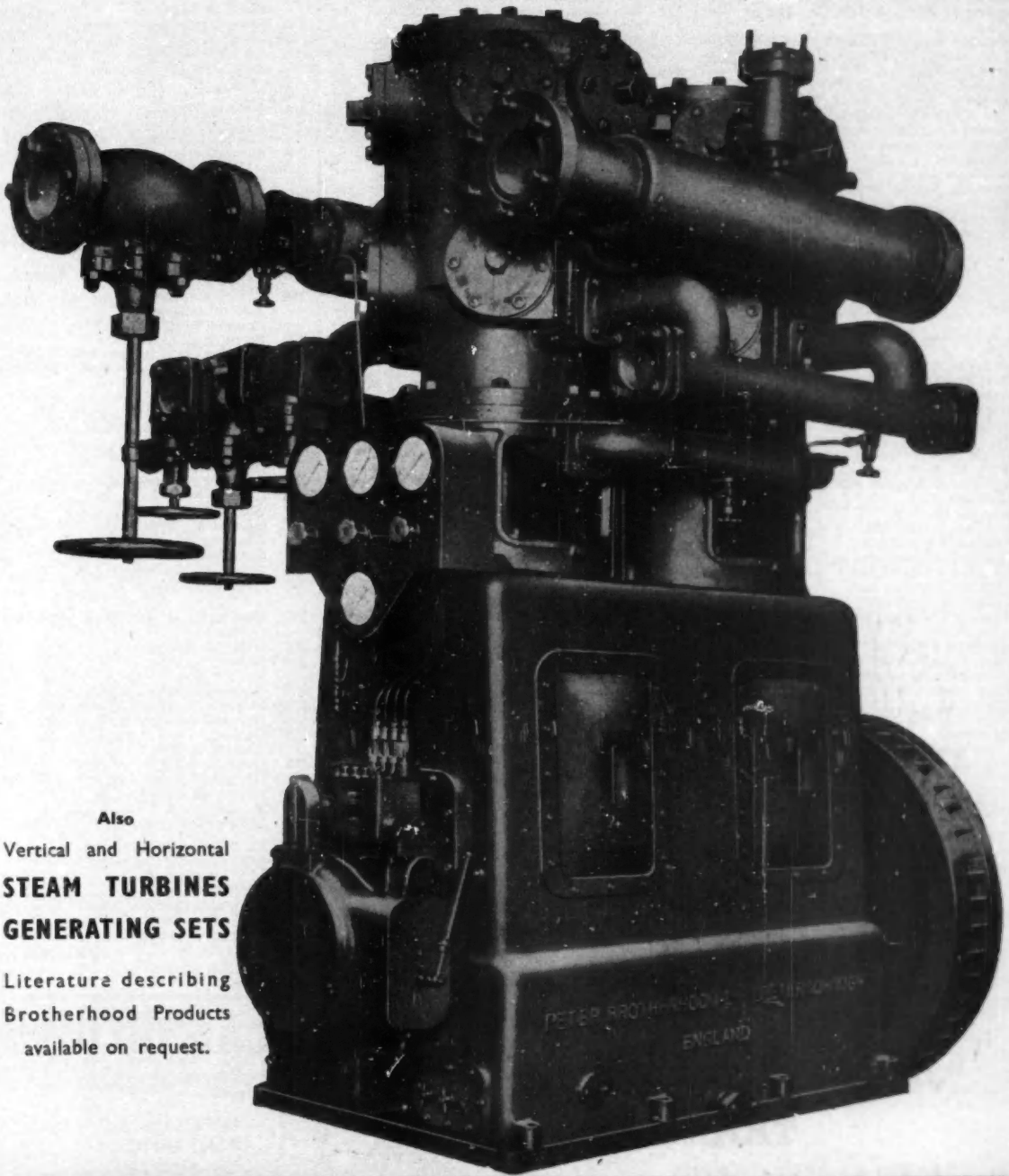
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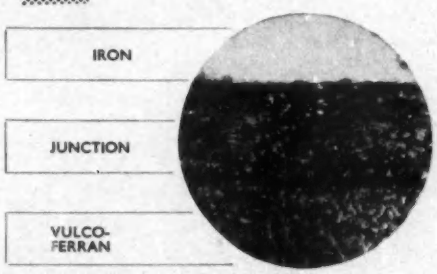


FIG. 1

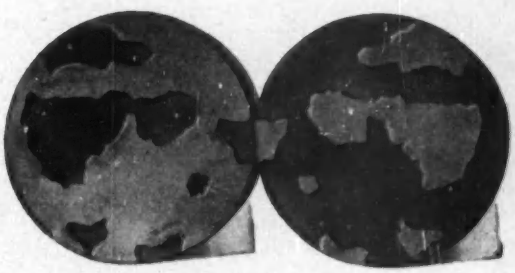


FIG. 2

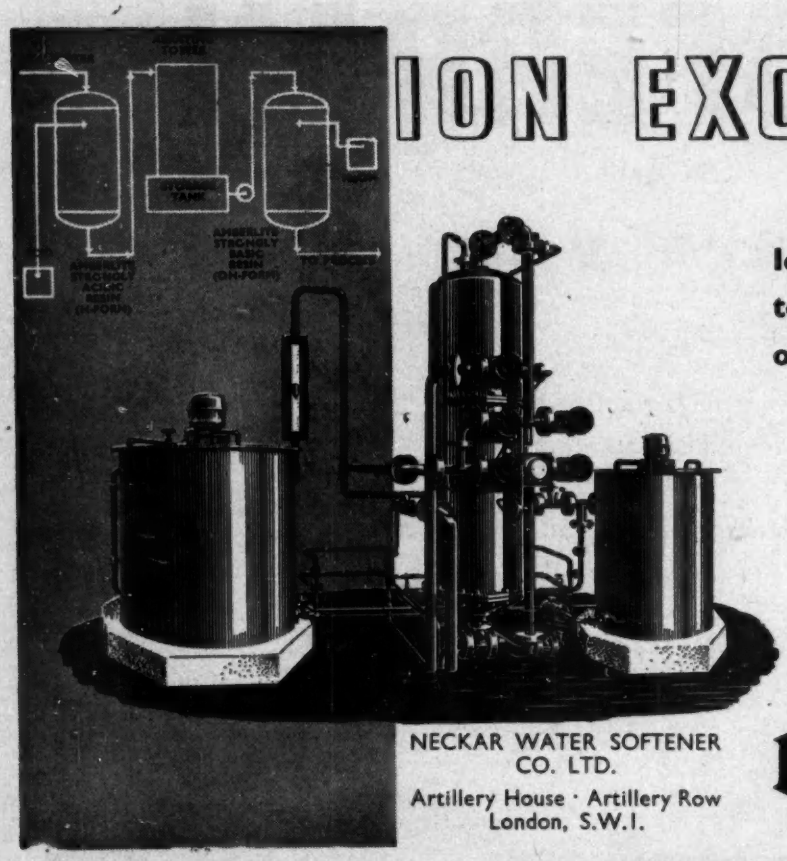
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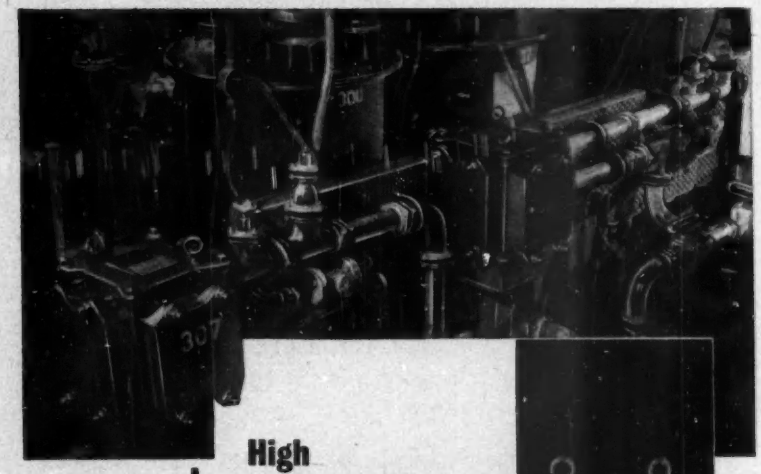
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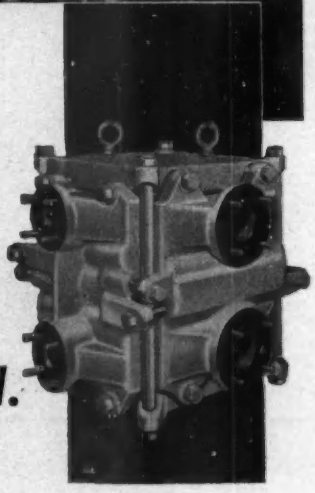
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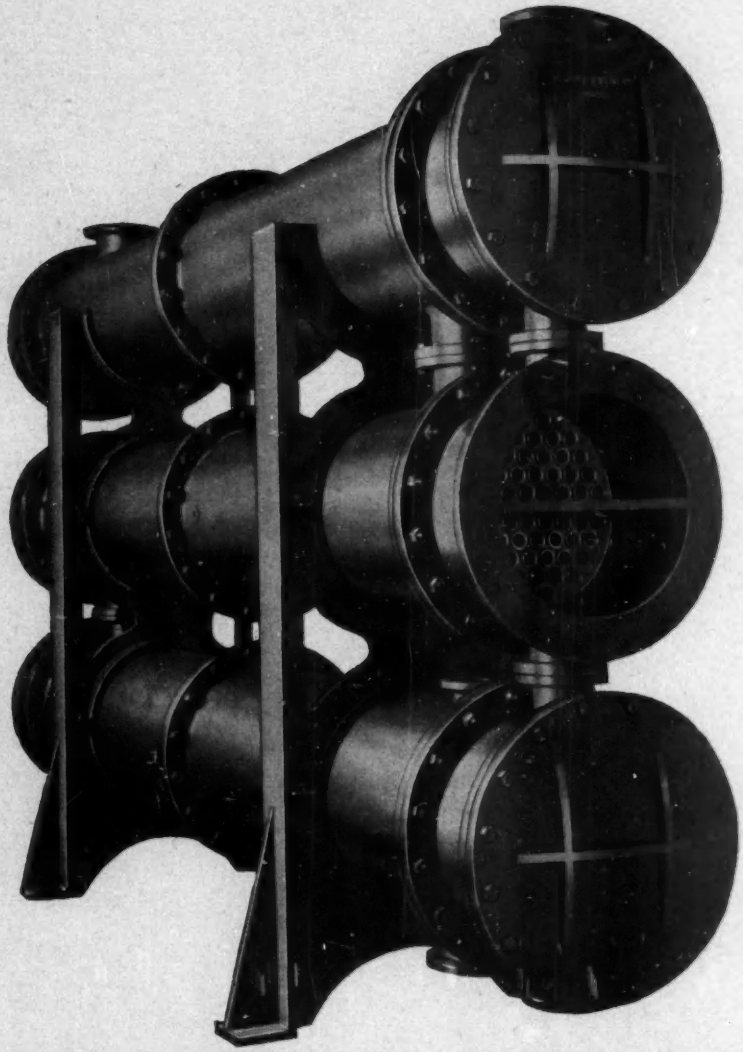
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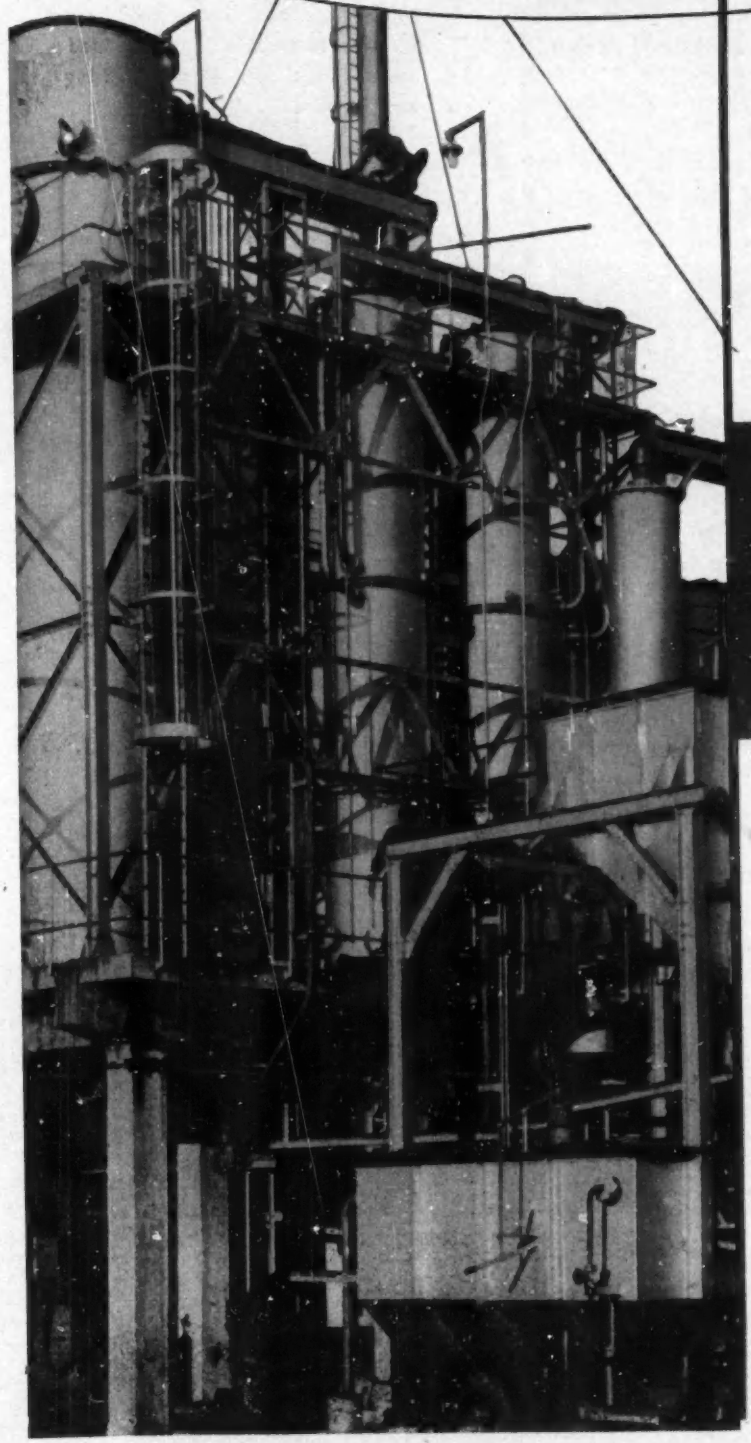
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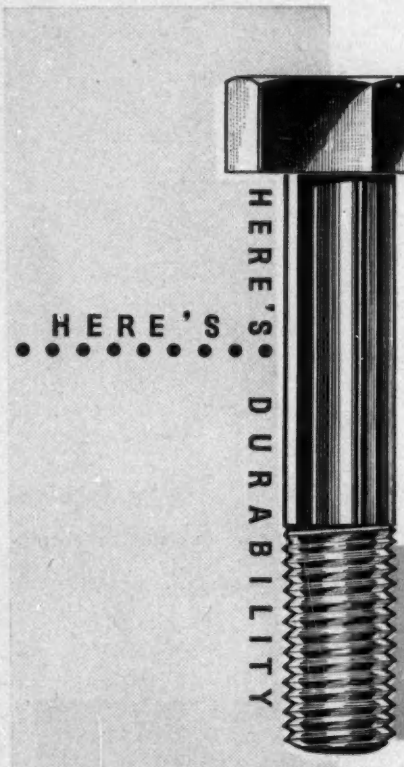
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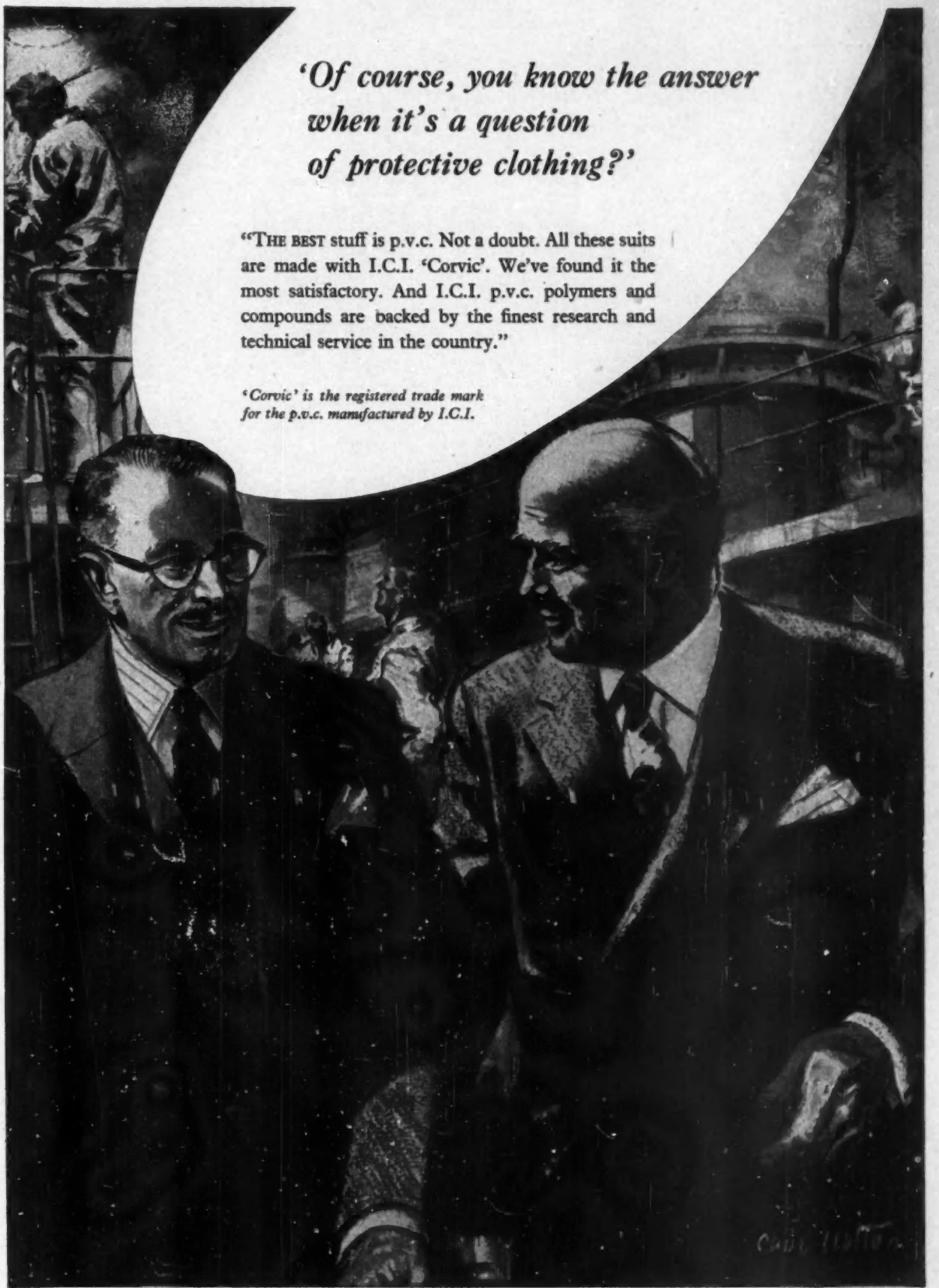
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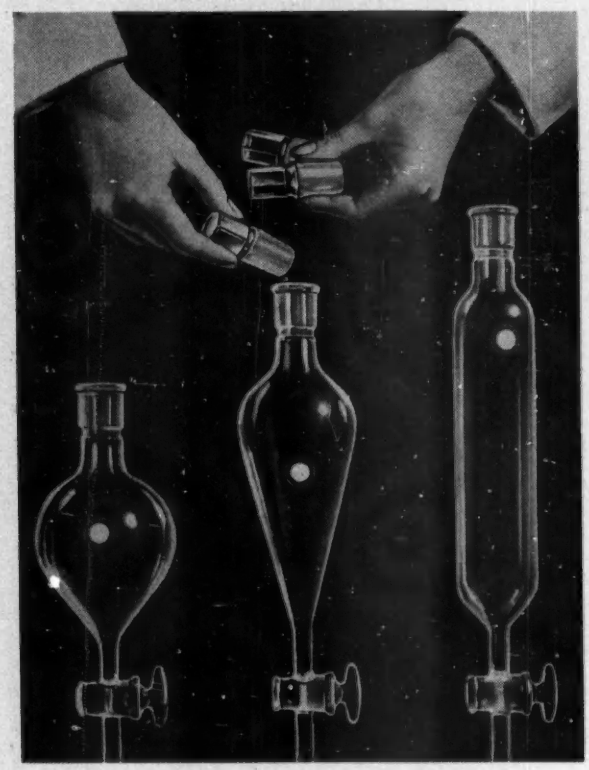
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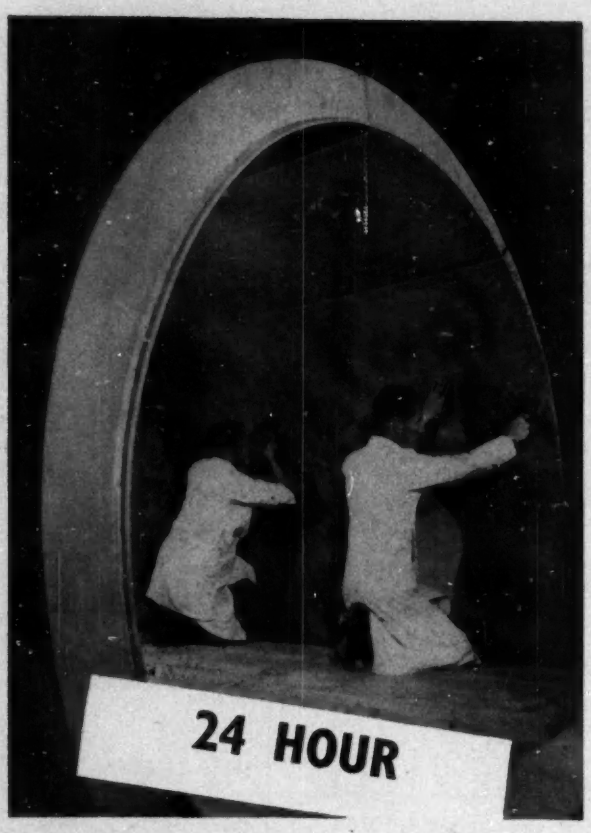
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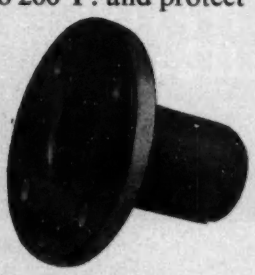
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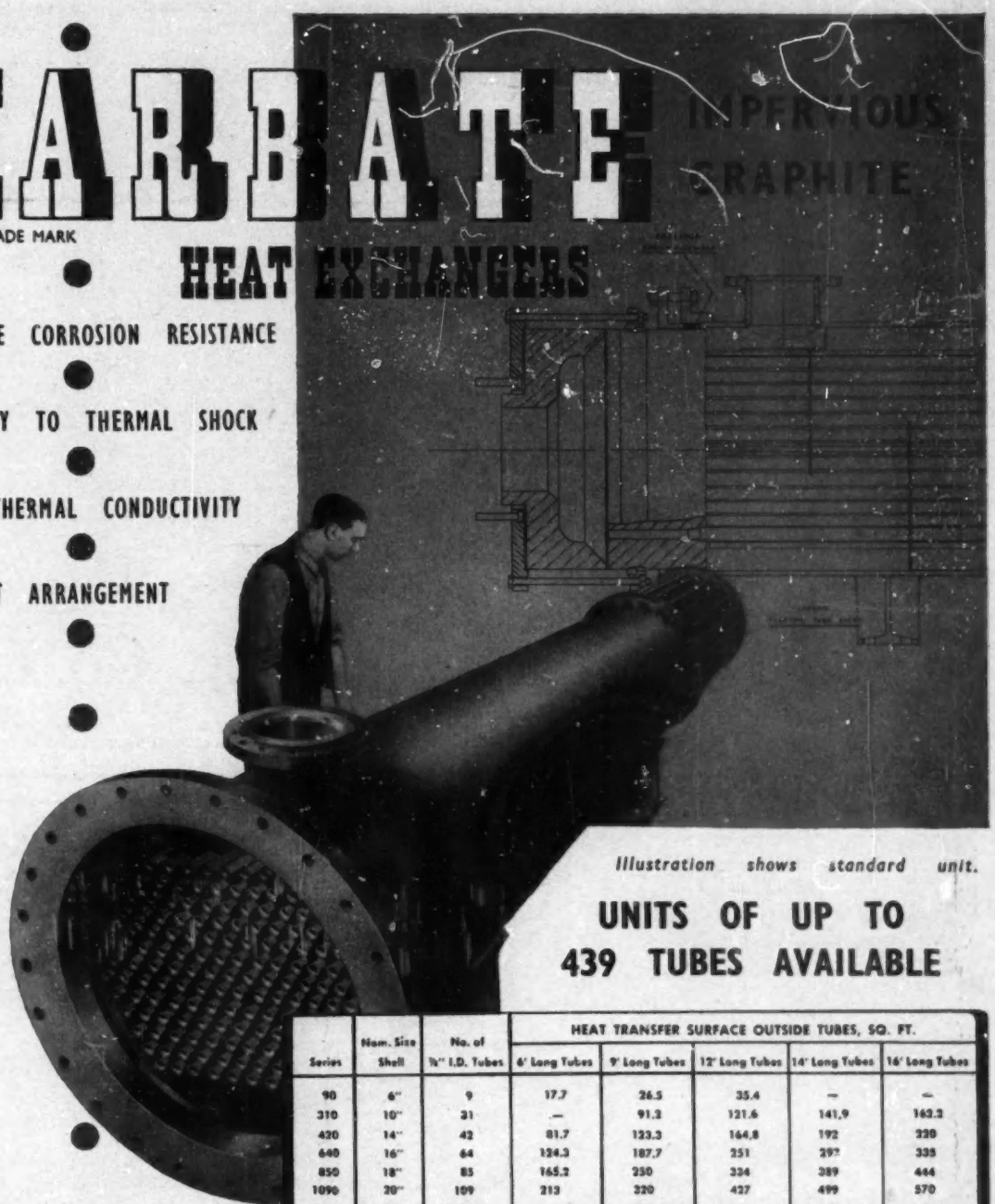


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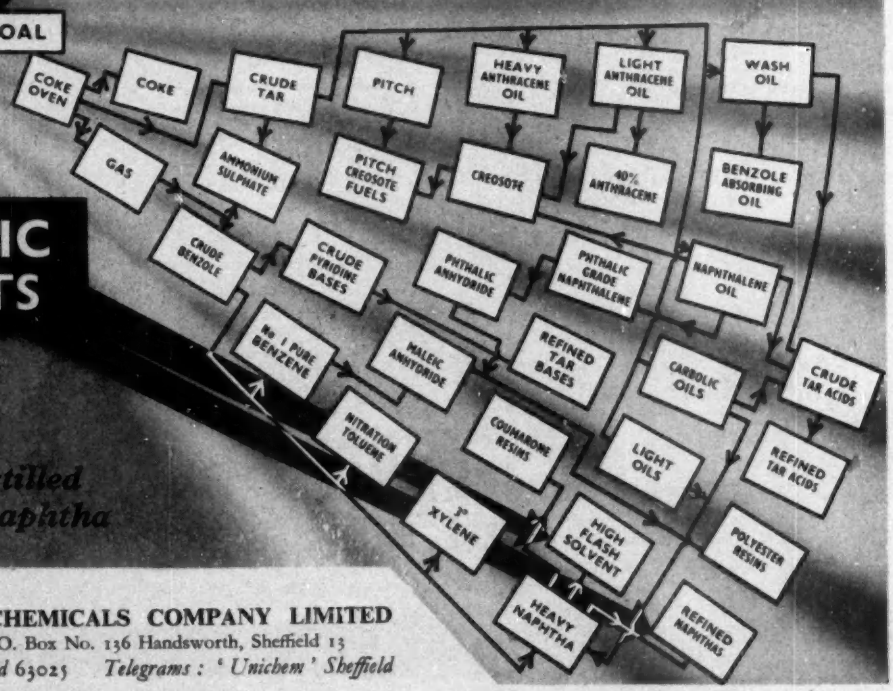
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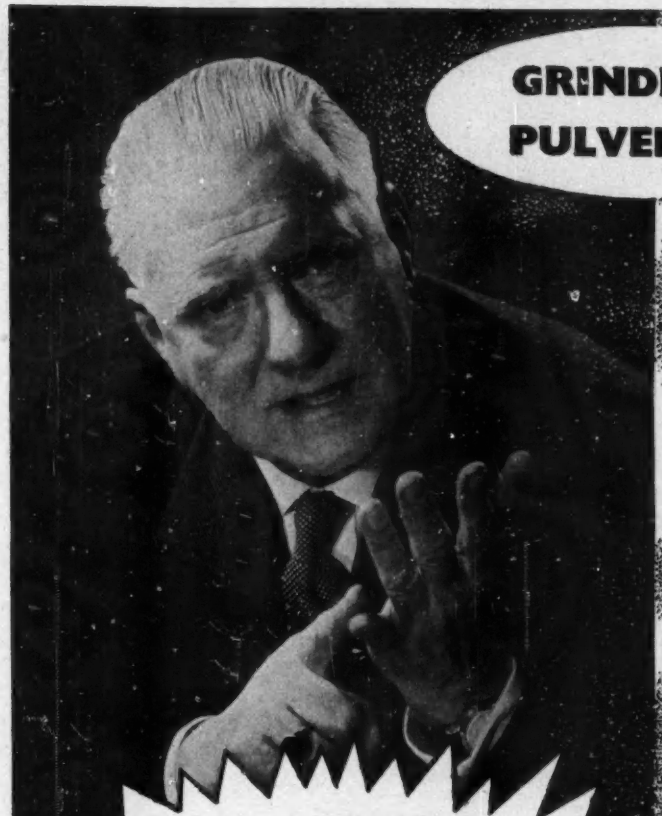
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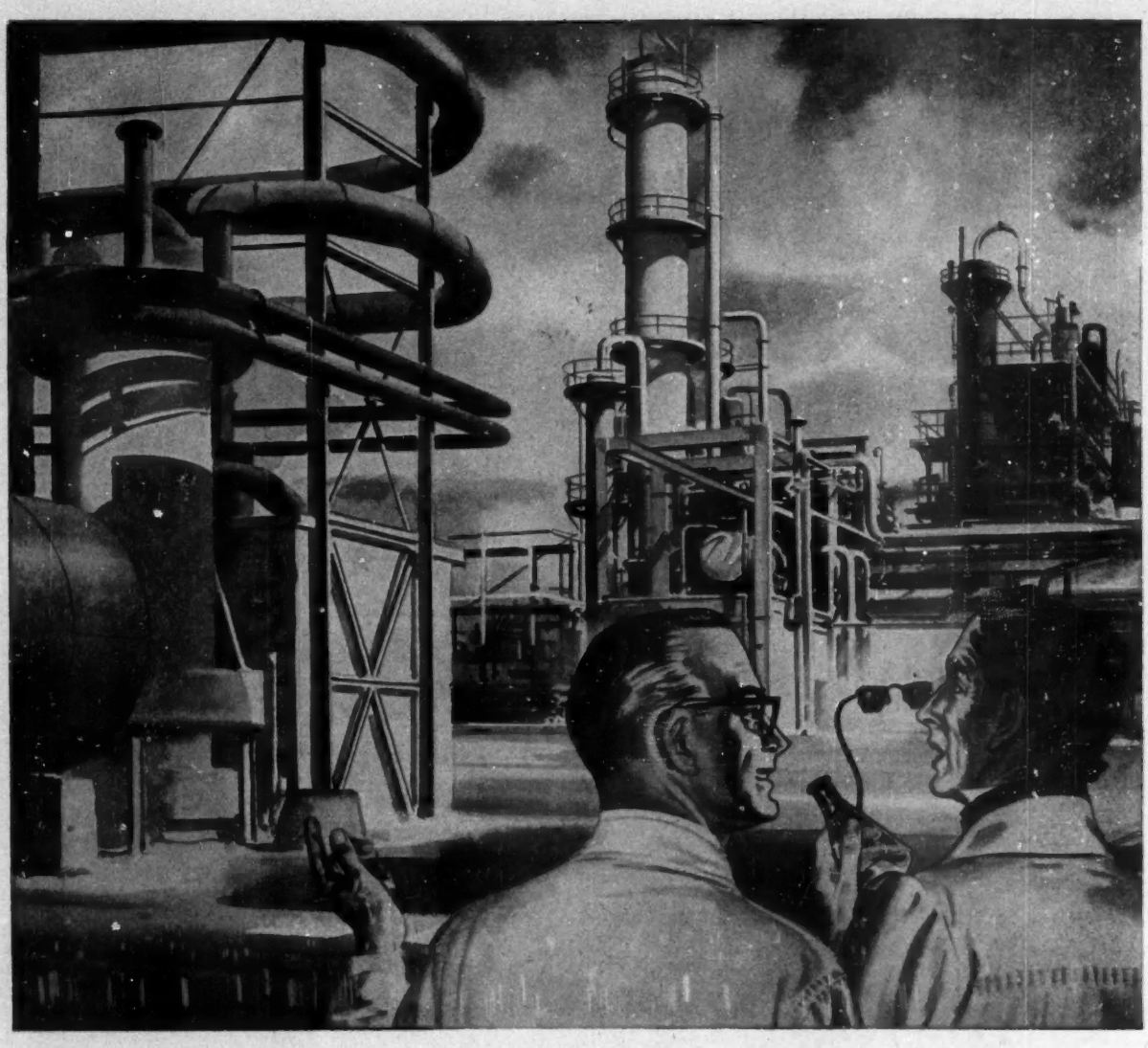
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CHEMICAL AGE

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CHEMICALS AND FTA

FROM the Economist Intelligence Unit has come the first attempt by an independent organisation to analyse the effect on British industry of the European Common Market with or without a free trade area in which Britain would be the leading participant. Part I of the book evolved deals with the problems of free trade and conclusions as to its general effects. In Part II are separate studies of various industries. In drawing up these much use has been made of OEEC publications, all the usual Government and trade publications have been consulted, extensive reports from correspondents have been studied and firms and trade associations have been questioned.

Study of the section on chemicals shows that it contains a wealth of information, but not a great deal of outstanding material. Certainly no moderate or large chemical concern would be unaware of the information and even of the analysis of it contained in this section. A strong criticism in our view is the poor presentation of the information.

What conclusions does the EIU come to on chemicals? The chemical industry will, by its own showing, be better off within a free trade area. Over 80 per cent of the industry, *measured in terms of capital employed*, has gone on record that, provided it was able to compete on fair terms, it would favour negotiations for an FTA. Reasons for this confidence are the outstanding changes that have taken place in the chemical industry over the last 35 years. Today, states EIU, British chemical industry is now on an equal, or better than equal footing, at least in Europe. Of particular significance is the recent growth of the petrochemical industry. Indeed, it is this section of the chemical industry and radiation chemistry which it is considered will provide the opportunities in the FTA and greatly increase British competitive power.

Based on the great increase in output from Germany since 1950 is the warning by EIU that Germany rather than Britain may become the leading European producer in an FTA. It is pointed out that at the same time the three largest German chemical companies, Bayer, BASF and Hoechst, together barely account for a third of the turnover of the German industry, about the same proportion as that held by ICI in the UK. Also no German company can muster capital resources comparable to those of the Royal Dutch-Shell group and other major producers of petroleum chemicals in Britain.

What is unfavourable to Britain is that the three German companies' sales have been increasing more than twice as fast as ICI's. Compared to ICI's £73 million exports the German big three exported £140 million. It is this emphasis on export markets, especially in Europe, that puts Germany in a strong position to penetrate further into the vulnerable French and Italian markets. But again EIU turns to the established lead by Britain in petrochemicals which it says puts Britain in a position to share with the US most of the advantages from the expected growth in European demand. Also, although the petrochemical industry is rising fast on the Continent, much of it is partly controlled by UK and US capital.

Differences in labour costs between British and continental chemical

industries are considered to have little effect on prices. Levelling up of continental wage costs should help to minimise the disadvantages of batch production if Britain enters an FTA. Meanwhile, the importance of industries such as the dyestuffs industry, where batch processing is used is decreasing, says EIU.

As far as raw material needs—coal, salt, limestone and water—Britain is as well placed as continental rivals, and in some cases better placed, where dependent on raw materials its competitors are for the most part equally dependent. Exceptions to be noted, however, are the access of the French and Italian chemical industries to large reserves of natural gas, yielding sulphur and a useful range of cheap chemical feedstocks. Nevertheless, Mexico's sulphur has offset sulphur shortages for the UK.

Although Britain has abundant and cheaper coal than its European competitors, part of this advantage may be lost in an FTA. Again, the EIU stress that the British chemical industry may improve its competitive position more if it becomes less reliant on coal and more reliant on petroleum than its continental rivals, for while the price of coal both here and in Europe seems likely to rise steadily in the next decade, the oil industry appears to be entering a phase in which the potential output of crude oil will be greatly in excess of demand, thus keeping oil prices low.

On the question of relative production costs in an FTA, the EIU suggests these are related to the cost of investment. At present the industry, both in Britain and on the Continent, provides a large part of its capital needs from its own earnings. Increased sales in an FTA should enable the costs of some plant to be recovered more quickly, but at the same time it is pointed out that keener competition in the home market will force a reduction in profit margins. While there is no reason to fear that British chemical concerns will be forced to operate on lower gross profit margins than continental competitors, British tax structure may not enable them to retain as high a proportion of earnings to help finance new plant. Hence the significance of British industry stressing the need for equal tax treatment in an FTA. The German chemical industry is already seeking additional concessions in order to find more money for expansion. The suggestion is therefore made that both British and continental chemical companies will become more dependent on outside sources of capital, and further, that Britain should make itself as attractive as possible to US capital, which it can only do by joining an FTA.

Bringing new plant into production at the right time will be a decisive factor in competition. The manufacture of chemical plant in this country is not as highly developed as it is in Germany. Membership of an FTA should therefore give British chemical companies easier access to German plant, although the benefit of this could be lost 'if delays, caused by labour disputes, in installing plant in Britain remain as serious as they are now.'

While in an FTA, chemical production costs could be, if only slightly, in Britain's favour. Britain's products would be more definitely competitive 'provided always that the industry keeps abreast of its competitors in research.'

The question of tariffs are considered by EIU. The chemical industry is one of the most highly protected of all British industries. Over a wide range of synthetic organic chemicals, a 33⅓ per cent *ad valorem* duty is levied while competing dyestuffs have been prohibited for 35 years. In order to avoid the difficulties involved in gradually freeing dyestuff imports, it has been decided that tariffs should replace the present system, if there is an FTA, so that the duty may be reduced in line with other tariffs. No tariff levels have been announced, but the EIU suggest that these are unlikely to be less than 33⅓ per cent *ad valorem* duty on competing imports. Licensing is a serious impediment to the trade with France. In Italy penicillin only requires an import licence, while in Germany licensing has been abolished and the tariff reduced by a further 25 per cent.

It is mentioned that the CM tariff on chemicals will be high, although lower than the present French and Italian tariffs. Duties on imported chemical raw materials are being kept as low as possible to aid domestic manufacturers. 'The loss to British exporters, competing with duty-free German products, from higher tariffs on finished chemicals in the Benelux market would be serious.'

Conditions in the industry are such, it is pointed out, that free trade seems just as likely to strengthen as to weaken private barriers to trade. British chemical industry should be apprehensive of the reconstitution of the great pre-war German chemical combine, IG Farbenindustrie, EIU reports. Indeed, there are indications that the three successor firms to the combine have already begun to share research expenses, while in France the prospect of removal of chemical tariffs is reported to have produced a favourable view of market-sharing arrangements with the French concentrating on those products that will be obtained economically from their natural gas resources and conceding products such as dyestuffs to German markets.

Such agreements in which the UK does not share would prove a barrier to the penetration of British chemicals into the French market. Therefore, says EIU, the strength of the chemical industry's pressure to secure genuine free trade in Europe may well depend upon the extent to which it is forced by the Restrictive Practices Act, to engage in genuine competition at home.

What will the British chemical industry gain in an FTA, and lose if there were a CM only? It is stated that those concerned in petrochemicals in general and plastics in particular should gain from free trade as will radiation chemistry. More chemicals will be needed by the large consumers of chemicals, that is, the metal, electrical engineering and motor industries, for the higher output they should achieve if there is an FTA. The UK share in continental imports is likely to increase from the 11 per cent in 1955 to at least 13 per cent in 1970, possibly more. If there is a CM only, it will fall sharply, direct UK exports to the Six being replaced by continental manufactured chemicals.

Of importance to the UK should there be an FTA will be research and the development of new chemical products and processes. Also, reduction of costs through larger scale operation, better promotion and more aggressive selling of British chemicals on the Continent will be necessary in an FTA. Even more important, EIU emphasises, will be the speedy translation of successful research into large scale production. And, once again, it is pointed out that Britain, in some respects, is lagging behind its competitors in research expenditure which is estimated at less than two per cent of its turnover. Germany's big three spent over five per cent of their turnover on research, the US leading companies over 4 per cent, and the Swiss Ciba five per cent, two-thirds in the pharmaceutical field. Finally, much will depend on the supply and quality of scientists, technologists and chemical engineers—at present an unknown quantity.

Doubts which UK chemical producers have—and with good reason—on the effects of free trade are concerned with restrictive trade practices and the questions of origin and dumping. It is to be hoped, however, that the idea expressed by EIU that Britain may improve its competitive position more if it becomes less reliant on coal and more reliant on petroleum, will not colour plans with regard to FTA. We would rather see an emphasis on coal gasification with its possibilities of providing useful feedstock for chemicals. The Suez situation indicated only too well the difficulties which can arise in petroleum supplies. We also consider that EIU dismiss too lightly the far-reaching possibilities of the French Lacqi natural gas deposits and Italy's natural gas supplies.

PRINCE PHILIP AT ILFORD'S NEW LAB

Research Facilities at Brentwood Inspected

THE DUKE OF EDINBURGH visited the new research laboratory of Ilford Ltd. at Brentwood on 6 December. The visit was informal and was part of the Duke's study tour of major British industries. He was accompanied by Wing Commander Henry Chinnery.

All members of the Brentwood staff other than those engaged on work which could not be left were given time off to welcome the Duke. He was greeted at the entrance by the Hon. James Philipps, Ilford chairman, and introduced to directors and executives.

The Duke then toured the laboratory, which consists of a long narrow building on two floors. Both floors have a corridor running the length of the building with rooms opening off both sides. Entering by the main door the corridor to the right gives access to the emulsion department under Mr. R. C. M. Smith. Making emulsion which is coated on film support is the basis of Ilford's business and a demonstration of how an emulsion is made was given in one of the specially equipped laboratories.

Testing Section

The party next visited the testing laboratory, under Mr. E. T. Purslow. The primary function of this department is to apply photographic and other tests to the experimental emulsions made and coated by the emulsion department. The photographic tests consist of exposing the material under controlled conditions and measuring the blackening produced. The behaviour is expressed by drawing a curve showing the relation between exposure and blackening. The measurement of the blackening and drawing of the curve have been studied for many years and an instrument was exhibited showing a stage in the application of automation to this work.

The next section visited was the chemistry laboratory, also under Mr. R. C. M. Smith. This consists of conventional type laboratories of modern design, and contains a variety of specialised equipment. Here again, the Duke stopped and talked to several of the laboratory assistants.

The last section was the physics laboratory, under Mr. R. G. Horner, where the electronics staff showed an apparatus recently completed for the duplicating of colour transparencies. This employs TV scanning techniques and provides automatic tone and colour correction in printing a colour transparency on to similar colour film. The equipment is ready for transfer to the colour laboratory for test under production conditions.



At the Royal visit to the new Ilford laboratories, l. to r. the Hon. James P. Philipps, chairman, the Duke of Edinburgh, Dr. G. B. Harrison, research director, and W. H. Dimsdale, managing director

Down the stairs, the Duke visited the well-equipped workshop and other laboratories and offices of the physics department.

The new laboratory is named after Colonel Ramsden, a late director who was associated with the early expansion of the concern. It is the most recent completed development in the company's expansion scheme. Ilford are also building an extension to their Mobberley, Ches., factory, which makes photographic papers, and have recently completed a 5-floor office block at their Ilford headquarters.

Interior walls of the new laboratory are finished in p.v.c. fabric. A special protective paint is used in the laboratories where the corrosive or staining effects of chemicals are a consideration. Furniture is designed in units and the tops are faced with melamine. Sinks are rubber-lined and a special drainage system is used for the recovery of silver from wastes.

Work in the laboratory is concentrated on photographic film. Equipment in the emulsion section is in many cases of new design. Actual production methods can be simulated here. The dark-rooms are fitted with safe-lighting to avoid affecting the chemicals used.

A physics section is concerned with investigating the materials used, processes and the special problems of colour photography. The testing section examines experimental materials from the laboratories and carries out tests on production methods.

Other work to be carried out at Brentwood includes research into the latest uses for photographic plates; those used in rockets and balloons for investigations at high altitude and in space, atomic research and X-rays.

Architect of the laboratory is Mr. E. Willison, the company's architect.

Plans to Fluoridate Water Supply

LANARKSHIRE, Scotland, plans to follow the example of Kilmarnock in Ayrshire and add fluorine to water supplies in a controlled area within the county. With 80 per cent of the child population showing signs of dental decay the county is seeking to meet this situation. The Secretary of State in 1955 disapproved of a scheme to fluoridate the water supplies of the Airdrie, Coatbridge and District Water Board in Lanarkshire on the grounds that he was awaiting the results of experiments then in progress. Lanarkshire's medical officer of health is planning a report on this subject and will present his views to the county council next year.

New Laboratory Planned

The Scottish Milk Marketing Board has received approval from Glasgow Corporation Planning Committee for the erection of a new laboratory building at 1235 Cumbernauld Street, Glasgow.

Pilkington's Extend Analytical Laboratory

To expand the scientific and technical control of raw materials and products, the central analytical laboratories of Pilkington Brothers Ltd., St. Helens, which form part of the research department, are being extended at a cost of £100,000. Work has already started.

The extension will be a two-storey building, designed to harmonise with the existing building which was formerly the home of the Mr. Austin Pilkington, a former chairman of the company. In 1949 this was converted to accommodate the analytical and process control sections of the research department. Equipment to be installed in the new building includes a spectrometer which will provide analytical results in minutes against the several days required by chemical techniques formerly used.

One floor of the extension, which is expected to be ready by next August, will be devoted to examination of glass products by physical methods.

Triplex Group Open New Lab for Fundamental Research

NEW fundamental research laboratory of the Triplex group of companies opened last week by Sir Graham Cunningham, chairman and managing director, at Holly Grange, Balsall Common, Warwick, contains the only electron microscope working on basic glass research in the UK. Primary aim of the laboratory



Metrovick electron microscope in the new Triplex laboratory

is to establish the basic knowledge that underlies the various processes used in the production of safety glass, both toughened and laminated.

Sir Graham declared that too little was known of what happened to glass when stresses were induced by toughening it. All the equipment installed had been put in with that main purpose, although the installations were flexible enough to be used to solve problems raised by other Triplex companies, including Quickfit and Quartz Ltd. and QVF Ltd.

Basic work to be undertaken will include finding out how the various atoms present in glass, such as silicon, sodium and oxygen, behave during the processing of glass to give it safety properties; the inter-atomic distances and spacings are of great importance as they determine the physical properties and consequently the safety properties of the glass.

The new laboratory will pursue three main lines of attack, involving the use of X-ray diffraction, electron microscopy and diffractions and, lastly, the study of the thermodynamics of glass during the safety-producing treatment.

Equipment in the X-ray diffraction laboratory includes a micro-densimometer to measure the amount of light absorbed by the haloes in glass, thus determining the diffractive pattern appearing on the X-ray film. The electron-microscopy laboratory will provide magnification of the order of ×60,000, with resolution down to 30Å. The thermodynamics laboratory, equipped by the Holly Grange instrument and equipment room, includes a tubular furnace, and its associated thermo-couple and calibration equipment,

Factors such as the breaking strength of glass will be determined under varying conditions in the mechanical properties laboratory, which will include beam-testing equipment and hydraulic equipment for break testing of circular plates. An important feature of the optics laboratory is a Vickers optical projection microscope. The heat treatment laboratory contains a high-temperature furnace for the production of toughened safety glass for testing purposes; it will give temperatures far higher than those in production use.

The chemical laboratory will, in addition to physical chemistry, carry out investigations on whether safety glass can be produced by methods other than the conventional heat-treatment processes.

Contract Awarded for Rutherford Laboratory

A £1 MILLION contract for the construction of the new Rutherford high energy laboratory of the National Institute for Research in Nuclear Science (see CHEMICAL AGE, 7 December p. 933) has been awarded to W. E. Chivers and Sons Ltd. The building will house the new proton synchrotron being built for the institute.

The roof of the concrete building housing the magnet will be of 4 ft. 6 in. concrete and 10 ft. of earth with provision for adding a further 10 ft. of earth over the magnet if necessary. The magnet room will be shielded from the experimental area by a 28 ft. thick concrete wall and with movable blocks up to a height of 12 ft. Earth banks will shield the experimental area on all sides. External beams are to be absorbed at the ends of long tunnels into the back wall of the experimental area, to ensure that the most intense particles are driven into a hillside.

Other facilities will be a control room for remote operation of the machine together with counting rooms, a 4,000 sq. ft. experimental preparation area and accommodation for the operating crew.

Sucrochemistry Research Projects

LAST month the Sugar Research Foundation Inc. approved a new research project to be carried out jointly with the British Cotton Industry Research Association. The new project involves the preparation from sugar of a superior sizing agent for the textile industry. Expenses and possible future patent rights are to be divided on a 50-50 basis. Annual cost to both the Sugar Research Foundation and the association will be £3,650.

Dr. H. B. Hass reports that the Cherokee Laboratories have produced, from sugar in Cuba, about 200,000 pounds of dextran which is being tested in oil well drilling and roughly duplicates the performance of carboxymethylcellulose, which is more expensive. They also have a sequestering agent for calcium which is being used in Cuba for cleaning Coca Cola bottles, reportedly with favourable results.

• Mention is made by Dr. Hass in his report (October/November) that Howards of Ilford (England) are the foundation's new licensee on the sucrose esters (see CHEMICAL AGE, 30 November, p. 884). Professor George K. Davis (project No. 107) has reported that whole bagasse is suitable for incorporation in cattle feed after being put through a hammermill. The National Bureau of Standards have available revised tables of viscosities of aqueous sucrose solutions and the Department of Agriculture has announced a sucrose-cream mixture which does not require refrigeration for storage.

Work by Damon Catron has shown that in hot summer weather young pigs fattened more rapidly on pig-starter rations containing saccharin than they did on corresponding feed with sugar present. The close resemblance between human and swine digestion is well known to nutritionists, so this is another piece of evidence of the lack of value of artificial sweeteners in reducing diets.

Radioactivity and Analytical Problems

FOUR papers on various aspects of radioactivity were presented at a joint meeting of the western section, Society for Analytical Chemistry and the Association of Public Analysts, held recently at Bristol. Mr. F. C. Bullock, APA president, was in the chair.

In his paper on 'Instrumentation in radioactive analysis', Mr. E. Minshall, briefly described the necessary precautions to be taken and corrections to be made to obtain true values. Mr. H. F. Freundlich, in 'The effects of radiation on living cells', discussed the Compton effect and the importance of oxygen and enzyme in activation by radiation.

In his paper 'Radioactivity in sea foods and waters', Dr. G. V. James, described the results of examination of imported canned foods, fish, seaweed, etc., as well as samples of drinking water and radioactive spa waters. He also referred to problems of preventing uptake of radioactivity by fishing vessels and their gear when in an area where a discharge had been made. 'Radioactivity and its detection in effluents' was the subject of a paper by Mr. R. H. Burns, who spoke of legal aspects of discharge and treatment of wastes as well as control of discharge by the Ministries and their radiochemical inspectors.

LONDON RIC ORGANISE FORUM ON CAREERS IN CHEMISTRY

FOR the benefit of the upper forms in local grammar schools, the London section, Royal Institute of Chemistry, recently organised a 'careers in chemistry' forum at Erith Grammar School. Several hundreds of pupils from Erith and other schools, with their parents, were able to put questions to a panel of experts representing chemists in industry, in the Civil Service, in consultant practice, and in teaching.

The five members of the panel, introduced by Dr. C. C. Hall, London section chairman, were: Dr. A. J. Amos, Dr. F. Aylward, Miss H. J. Cottrell, Mr. A. H. Thorneloe and Mr. R. A. Wells.

Mr. R. T. Sumner, headmaster, opened the meeting by quoting some statistics from the Ministry of Education on the number of qualified scientists the country was hoping to train by 1959. Startling increases were hoped for in all branches, and he was pleased to welcome the chemists who apparently were prepared to do some canvassing on their own.

Dr. Amos opened on behalf of the chemist in private consulting practice. He said that there was an idea that with the growth of research organisations, the private consultant was becoming an anachronism. He reminded his audience that this warning had been given to him 25 years ago when he entered that branch of the profession, and it was no more true today than it had been then. There was now, and always would be, plenty of employment and a demand for the services of a good consultant. Not only were their services required by small firms with limited capital resources, but many large organisations with extensive research facilities frequently sought to relieve pressure on their own staff by calling in external help.

Always in Demand

The independent opinion of a consultant chemist was always in demand, and the ever-increasing complexities of the legal system and its impact on products used in everyday life was likely to increase rather than reduce the demand for such opinions. Work in a consultant's laboratory brought wider interests than were possible in any other field, but the very independence of the organisation and the fact that its prosperity rested on individual human qualities made it a rather less secure occupation than the large research institutes or industry.

The need for teachers and lecturers in chemistry at all levels was the subject on which Dr. Aylward spoke. The future supply of trained men and women depended on such persons, for without them the whole teaching structure would fall to the ground. The great increase in scientific interests had underlined the need for more teachers. He described the qualities necessary in the successful teacher of chemistry, emphasising that the first one was that necessary in all teachers, namely, an interest in people, just as much as an interest in the subject to be taught.

Miss Cottrell put the viewpoint of a woman chemist in industry. Until recently, for a woman to teach chemistry was quite normal, but a woman as a scientist in industry was something novel. Miss Cottrell gave some interesting reminiscences from her own experience and warned any aspiring young ladies in the audience that to be accepted they would not only have to prove their ability against a certain amount of prejudice but be useful and preferably decorative as well. This latter item should in no way be scorned. She always felt that as a woman she had more difficulty in persuading people to put developments into effect than a man would have in the same position.

Mr. Thorneloe summarised the opportunities for chemists in industrial organisations. He said there was unlimited scope for new graduates in a wide selection of industries, all of which provided excellent postgraduate training. The rewards and prospects compared favourably with those in any other branch of the profession, and it was on the shoulders of the scientists in industry that the economic future of this country must largely depend.

Mr. Wells outlined conditions for scientists in the Civil Service, saying that while it was true that the financial rewards in the topmost branches of the service might not equal those attainable by 'captains' of industry, salary scales in general were reasonably rewarding and by no means as inflexible as a casual glance might suggest. He detailed the various categories of scientific civil servants with their general salary levels and described the various means of entry and promotion.

The panel then dealt with a continuous flow of questions from the audience. They were asked to define the difference between a physicist and a chemist. The true answer seemed to be elusive as ever.

Harwell's Unique Opportunities for Designing New Instruments

UNIQUE opportunities for the development of new types of instruments exist at Harwell. This was pointed out by Dr. R. Spence when he lectured on the subject of new instruments from Harwell at the Brunel College of Technology, Acton, recently during a joint meeting of the London section, Royal Institute of Chemistry and the college Scientific Society. The reason for this was that there were collected together in the one organisation chemists, physicists of all types, electronic engineers, instrument designers and mechanics, together with magnificently equipped workshops.

Some of the instruments developed had been handed over to commercial concerns to exploit, as it was felt that there would be a sufficient demand to warrant this. Other instruments, of more specialised character, were designed and made for 'Harwell use' only, whilst some never got beyond the 'hook-up' stage. In addition, the mass of new problems that Harwell had to tackle, or old problems made far more difficult by the dangerous conditions in sites of high radioactivity, created a great demand for instruments, as instruments were the 'eyes and ears' of the scientist.

The first illustration was a calorimeter designed to determine the energy 'deposited' in a sample of material put into a reactor, and therefore exposed to a 'neutron flux'. The calorimeter had to be small, it had to be capable of being moved by remote control into definite positions in the reactor, the 'materials of construction' had to be such that they did not acquire any dangerous radioactivity in the neutron stream, nor must neutrons cause any change in them, and all the measuring instruments had to be outside the pile.

These conditions were met by using a small, adiabatic-type calorimeter made from glass and aluminium. As its interior had to be evacuated, the leads were brought out through plugs of sulphur. It was calibrated electrically, the temperature rise imparted by a measured amount of electricity being determined.

Certain radioactive substances of short half-life, and therefore high intensity of radiation, present a problem when a determination of the quantity present is wanted. For instance, any weighing process presents great difficulty, as the sample is quite a lot above room temperature. Dr. Spence described how this problem had been overcome in the case of polonium 210 by the design of an ingenious, relatively simple and therefore cheap, rate-of-heat-production meter, in which the measurements were electrical in nature.

The health-hazard involved in the handling of intensely radioactive compounds during determination could either be overcome by the use of clumsy and expensive handling methods, or by working 'in the open' on exceedingly micro-scale. In consequence, Harwell had devoted a lot of work to devising super-micro methods of determination. An instrument of obvious application was, of course, the polarograph. The normal type was not sensitive enough, however. The sensitivity had been greatly improved, first by the introduction of the square-wave polarograph, an instrument now manufactured commercially, and later by the development of the radio-frequency polarograph.

Another development had been an ion-exchange column for analytical work using micron-sized ion-exchange resin particles in a polythene tube with a bore of a few microns only.

Finally, Dr. Spence gave two examples of continuous analysers for monitoring, for instance, the effluent from the ion-exchange column used in the extraction of uranium. One was based on the use of a traditional-type colour reaction, carried out automatically with automatic recording of results, whilst the other was based on a small-scale 'spinning column' liquid-liquid extractor with monitoring of the extractant.



★ TECHNIQUES in packaging and packaging materials have made great strides in recent years, despite the criticisms levelled by users at chemical manufacturers at a recent Institute of Packaging meeting (see CHEMICAL AGE, 30 November, p. 879). That the UK packaging industry is conservative is obvious from the way polythene containers have been developed on the Continent and in the US, but that is not to say it cannot meet any demand made on it.

The combination of constructive criticism from users and market study on the part of chemical manufacturers is enough to show exactly what type of package is required. The chemical industry is one of the largest users of packages in a wide variety of forms and materials. ICI alone spend about £11 million a year on new packages or packaging materials; seven years' expenditure on that scale is roughly equivalent to the company's post-war investments at Wilton.

★ IT IS surprising that the manufacture of chemicals on as large a scale as the UK industry does not generate sufficient noxious odours to make life unbearable in any number of chemical-producing centres! That this is not the case is a tribute to the strong community-attitude of manufacturers to-day.

But in common with most producers, Albright and Wilson are occasionally the butt of local councillors and newspapers. This is bound to happen from time to time, but is a rare occurrence in these days of stringent safeguards against leaks and breakdowns. The company is already spending £100,000 to prevent atmospheric pollution from its Oldbury phosphorus plant.

The latest 'offence' is said by Oldbury health department to have come from waste products, the result of a breakdown in new equipment involved in the production of lubricating oil additives. The waste products are to be dumped in barrels in the North Sea and it is unlikely that this particular plant will upset local susceptibilities again.

★ HAS THE rise in the standard of the Royal Institute of Chemistry's final examination been so marked as to put graduate membership beyond the reach of most part-time students? That question was raised by some London section members at their recent annual meeting after a talk by Dr. H. T. J. Ellingham, RIC secretary, on the new grade of graduate membership.

Dr. Ellingham maintained, and several speakers agreed, that there had been no sudden rise in the standard at the time the new regulations were introduced, although it was true that a gradual rise had been taking place over many years and was likely to continue. He pointed out, however, that the council's study group on the structure of the graduate membership examination was actively concerned with the problem.

It was suggested that because of the difficulties now facing part-time candidates for both London external degrees and institute examinations, the numbers enrolling for them in many technical colleges had seriously declined. Dr. Ellingham hoped that in future more of the promising part-time students would be able to transfer to full-time or sandwich courses for at least the final stages of their training.

★ THE PRODUCTION of leather might be one of the world's oldest industries, but the modern tanner is not slow to turn to the latest tools of science to help to improve his product. Dr. K. W. Pepper, director of the British Leather Manufacturers' Research Association, recently described an experiment in which calfskins were cured by gamma radiations, as having been 'technically successful.' He said that BLMRA was keeping in touch with the Atomic Energy Authority.

There is no doubt, however, that economic and other considerations will rule out the use of such radiations on a commercial scale for many years.

One of the biggest tasks facing the leather chemist undoubtedly lies in the realm of sole leather, which is meeting mounting competition from other materials. Here BLMRA is working on the impregnation of vegetable-tanned leather with proprietary waxes, while for full-chrome leather, polyisobutylene is being used.

★ A FASCINATING book — Microscopium—has reached this desk. Written by Maria Rooseboom, it has been published through the initiative of Mr. N. Oliver, director of Pfizer Ltd., Netherlands section, Rotterdam. Pfizer have also granted the financial support which made possible the publication.

Not all subjects of study lend themselves to the formation of a satisfactory basis of a book of this type. But Dr. Rooseboom's book, based on the collection of microscopes in the National Museum for the History of Science, Leyden, with the exception of about a dozen instruments, gives interesting and abundant information. The enormous influence which an instrument like the microscope, now familiar in all aspects of scientific study, has had is clearly shown in the historical synopsis.

The book is lavishly illustrated with old engravings, line drawings, photographs and coloured prints. These illustrations alone arouse the reader's interest, whatever his knowledge or usage of the microscope. As only a few copies are available in this country, Alembic counts himself fortunate to be favoured with one.

★ TIMIDITY on the part of ICI and the cutting back of capital expenditure might well lead to the starting point of conditions of industrial depression and unemployment in Britain. That view was expressed by Mr. S. P. Chambers, a deputy chairman of the company at a recent meeting of the central council. Despite present uncertainties about the country's economic future, the ICI main board has no intention of adopting 'panic measures' or of following an ultra cautious policy in order to meet the worst that could happen in 1958 or later years.

The chemical industry throughout the world is a progressive one and ICI intend to continue to make progress. Mr. Chambers added, 'We cannot stand still, if we sit back we shall fall behind our competitors in other countries.'

He continued by stressing the vital role of savings, without which there can be no capital. Although Britain was saving more now than six years ago, it was not enough; her savings were less per head than those in the US, Russia and Germany. If the battle for savings is lost, then we lose the battle against inflation and the battle against foreign competitors. Mr. Chambers spoke of two main ways by which everyone can help. By using present resources as efficiently as possible, which means increasing productivity, and by personal savings.

★ A GREEN CROSS will replace the familiar red one to mark first-aid cabinets if industry adopts the BSI recommendations on 'Safety Colours in Industry' (BS 2929). This break with tradition was agreed by the committee which drafted the standard for two reasons: the green cross symbol was in line with the international code and green is already clearly associated in the public mind with safety, while red carries the meaning 'stop—keep away.'

These reasons are spurious. The red cross is recognised and respected throughout the world. Confusion would be complete if first-aid units in industry were to be marked with a green cross, and the world-wide Red Cross societies continued as such. Or does the BSI contemplate a British Green Cross Society? The BSI should think again.

The new recommendations are 'simple' and are intended to eliminate the confusion that exists in industry through the use of a variety of different colour codes. In the new standard, red means stop; orange-yellow means warning or danger; green is used to identify or locate safety equipment and safety routes.

Alembic

Analytical Review

NEW EDTA METHOD FOR MAGNESIUM

THE analytical applications of ethylenediamine tetra-acetic acid are familiar to many analytical chemists. Most of the new developments in this field are concerned with the application of new metalochrome indicators(1) to the titration of various metals or with some other application to titrimetric analysis. For EDTA is undoubtedly a titrant *par excellence*, furnishing a rapid, accurate method for the analysis of practically every metal ion carrying more than unit charge.

In a recent issue of *Analytical Chemistry* there appears a startling new EDTA method for magnesium—a gravimetric method in which EDTA is used for the first time as an analytical precipitant. Bricker and Parker(2), report that between pH 3.4 and 4.0 magnesium deposits slowly and quantitatively as $Mg.C_{10}H_{14}O_8N_2.6H_2O$ in the presence of excess of the disodium salt of EDTA. The precipitate can be dried at room temperature and weighed as the hexahydrate or alternatively it can be vacuum dried at 100°C and weighed as the anhydrous salt. Either weighing form has, of course, a very favourable conversion factor—9.54 per cent and 12.82 per cent as MgO respectively. Generally, no precipitation of magnesium occurs until the solution has been set aside for three to five hours when a white, granular, easily-filtered salt deposits. A minimum standing time of 48 to 72 hours is recommended, but even then the precipitation is incomplete. Optimum concentration of reagents is given by

$$V = 13 (A + B)$$

where V = volume of pptn. medium (ml.), A = millimoles of magnesium, B ($\geq 4A$) = millimoles of EDTA present. It would appear that precipitation is virtually quantitative after 12 days.

Worth Attention

Whilst these features detract from the practical value of the method, the novelty of this new EDTA technique deserves attention. The pH limits are somewhat narrow; EDTA itself precipitates at about pH 2 whilst no deposition of the magnesium salt occurs above pH 5. Aluminium and manganese appear to interfere more or less seriously, but the other cations examined did not when sufficient reagent was added to form their soluble complexes. Phosphate, tartrate and citrate decreased the recovery somewhat; other 'complexone' type compounds markedly affected the recovery, e.g. bishydroxyethyl ethylenediamine diacetic acid permitted only 52 per cent recovery of the EDTA-Mg salt, whilst hydroxyethyl ethylenediamine triacetic acid completely inhibited its deposition.

Some of the interesting features of the chemistry of this salt reported in the paper are as follows: solubility at room temperature—6 mg./100 ml.; slight solubility in absolute methanol; converted to the oxide by ignition in air; negligible vapour pressure below 40°C.

A more pleasant alternative to the air drying or vacuum drying at 100°C suggests itself, viz., solution of the precipitate in an ammonia/ammonium chloride buffer and titration of the EDTA in the complex with standard nickel solution. This new method, whether with the gravimetric finish, or the titrimetric one suggested here, is unique in that for the first time a direct EDTA method is available for the determination of magnesium in the presence of calcium.

By

Dr. T. S. West

This is the first of a series of monthly articles in which Dr. West will discuss new developments in analytical chemistry. Royal Institute of Chemistry Meldola medallist for 1957, Dr. West is a lecturer in the chemistry department at Birmingham University. **(See 'People in the News', page 987)**

VP Chromatography

Vapour-phase chromatography of the permanent gases: In the past few years the technique of vapour-phase chromatography has become indispensable in many laboratories dealing with widely differing products. The chromatography of materials which are volatile at slightly elevated temperatures is familiar, but much less is known of the behaviour of the permanent gases, e.g. oxygen, nitrogen, nitric oxide, carbon monoxide, carbon dioxide, etc. Most of the methods which have been applied to the permanent gases so far have been based on adsorption chromatography at slightly elevated temperatures. Thus hydrogen, oxygen, methane, carbon monoxide, etc., have been separated on activated charcoal(3), (4) and hydrogen, nitrogen, oxygen, carbon monoxide and methane on molecular sieve(5). In one of the most recent developments 40–60 mesh silica gel has been used at the temperature of acetone/dry ice to give a clean separation of several gases(6). A thermal conductivity cell was used in conjunction with a 6-ft. (36 ml. capacity) column, with helium as carrier gas at 10 lb. per square inch and a flow rate of 45 ml./minute. Oxygen, nitrogen, nitric oxide and carbon monoxide were cleanly separated whilst a good separation of nitrous oxide and carbon dioxide in air was obtained even at room temperature. Low temperature columns have also been operated by a few earlier workers, e.g. Keuleman, Kwantis and Zahl(7) and Drew and McNesby(8). There can be little doubt that many of the older methods of gas analysis (i.e. permanent gases) may well be replaced by this versatile new technique (which requires very simple apparatus) if further work along these lines is continued.

Square wave titrimetry: Recently there have been many developments in physicochemical methods for the detection of end-points in titrimetric analysis. A new method—square wave titrimetry—has now been developed for redox, complex-formation and precipitation titrations(9). The principle is that a square wave signal of constant current or voltage amplitude is applied to a pair of platinum micro electrodes and the output of voltage or current is measured during titration. For reasons which cannot be discussed here, the constant voltage method (20–50 mv.) was preferred.

Titration of 10^{-5}M iodine by this method yielded end-points which showed greater changes in current near the end-point than did an amperometric titration, and it was estimated that the new method was ten times more sensitive. The shape of the current-voltage curves was markedly affected by the pretreatment of the platinum electrodes. Cathodisation in 0.1M sulphuric acid was found to yield optimum results. The curves obtained in the titration of ferrous sulphate with ceric sulphate showed sharp end-points but exhibited unusual shapes. Unconventionally-shaped curves which are strongly reminiscent of many high-frequency curves, particularly with respect to non-linearity, were recorded for the silver nitrate titration of a mixture of chloride, bromide and iodide. Again, end-points which were sharper than the corresponding amperometric end-points were obtained in dilute solution.

Useful Adjunct?

It is too early yet to make any pronouncement on the applicability of this new method, particularly since it is difficult to estimate the apparatus requirements, but it is very probable that it will form a useful adjunct to the radio-frequency titration method, particularly for dilute solution work.

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HEATING EFFLUENTS FROM CARBONISING PLANTS

TREATMENT of effluents from carbonising plant was discussed by Mr. R. B. Niezgoda in a talk given in Manchester. Mr. Niezgoda is a research and development engineer of R. and J. Dempster, constructional gas and chemical engineers.

He said that the problems of heating effluents from carbonising plants was very complex and no one solution was likely to be universally applicable. Three chemical processes had attracted attention in recent years. One, developed by Cooper and Bouch, used nitric and nitrous acids for the destruction of residual toxic matter in ammonia still effluents. The process was expensive and did not produce an effluent pure enough to be discharged into waterways. The second chemical process, the Corby process purified effluent still in two stages. This process had been proved successful, but like other processes for the treatment of large volumes of weak liquor of complex construction, it entailed capital charges and running costs which exceeded revenue obtained from the recovered by-products.

The Tingley process was described in detail. Although the original conception of the Tingley effluent treatment plant was finally abandoned, Mr. Niezgoda suggested means by which the process could be considerably simplified. There did not seem to be much point in using two solvents for the recovery of phenols. If crude liquor was treated with butyl acetate or a solvent of similar absorptive capacity, the losses of liquor solvent due to the bigger volume of liquor would increase, but exhaustive extraction of both groups of phenols could be achieved. Much work had been done with methyl isobutyl ketone as solvent. Experiments were being confirmed in a pilot plant and in the laboratory, but the work had not yet reached a stage where it was possible to give definite papers on the recovery of solvent.

Lords Uphold Evans Medical Tax Appeal

EVANS MEDICAL SUPPLIES LTD., who received £100,000 from the Government of Burma under an agreement made in 1953 by which it undertook to make available technical information, need not pay tax on the money, the House of Lords ruled last week. Costs were awarded against the Crown.

Their Lordships (Viscount Simonds, Lord Morton, Lord Tucker, Lord Keith and Lord Denning) by a majority allowed the company's cross appeal and dismissed the Crown's appeal from a decision of the Court of Appeal that the case should be remitted to the Special Commissioners of Income Tax. The company claimed that the £100,000 was a capital payment and not taxable, and that it did not arise in the course of trade. The Crown's case was that it was received by the company for the provision of services in the course of its trade.

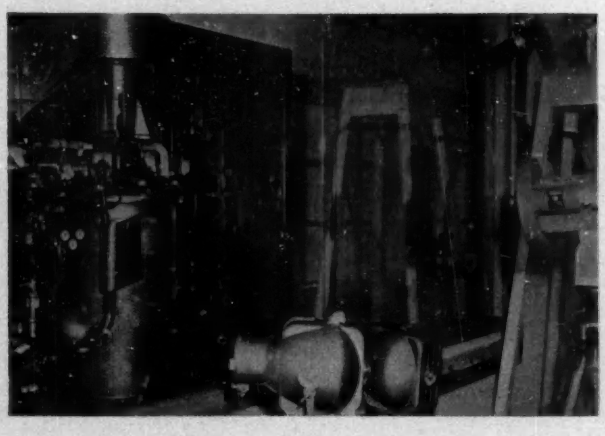
Fruit Grower's Doubts About Use of Chemicals

THE need for assurances with regard to the expanding use of chemical agents in horticultural and allied food production was covered at the annual dinner of the Scottish Seed and Nursery Trade Association in Edinburgh on 27 November. Scientists were asked by Mr. D. L. Storrie of Dundee, a noted fruit grower whether some of their phenomenal successes had not been achieved to the detriment of the consumer's health.

'I should like to find one panel of really first-class scientists to tell me that the hormone treatment of cattle, the constant spreading of weedkillers, the use of artificial fertilisers, and the spraying of tomato plants have no ill effects on the humans who eat them.'

He believed that agriculture was at the crossroads in this matter and urged the need to have scientific development and humanitarian factors linked.

Remote Controlled Nitration at Ardeer



These TV cameras scan the process vessels in the nitrating room at ICI's Ardeer nitroglycerine plant. Their pictures are screened on the main instrument panel in the control room housed in a separate building. The unit is completely remote controlled

In Parliament

Basis of Approval for Methane Imports

Approval for the Gas Council's experimental imports of liquid methane was given on the basis of indications that cheaper gas could be provided by full-scale imports of this material than by any other known method of gasification. This was stated on Monday by Mr. David Renton, Parliamentary Secretary to the Ministry of Power.

Science Students

In 1955-56 there were 2,964 full-time students taking science courses in English and Welsh further educational establishments, declared Sir Edward Boyle, Minister of Education, in a written reply last week. Of that number 93 were taking sandwich courses. The 1954-55 total was 3,173, of whom 71 were taking sandwich courses. Part-time day science students in 1955-56 numbered 11,998 (11,010). Number of evening class enrolments for 1955-56 (1954-55 in brackets) were: biology 5,775 (5,469); chemistry 33,426 (34,087); geology 1,421 (1,322); metallurgy 7,025 (6,338); physics 43,605 (40,677); general science 48,073 (45,145).

Emigration of Scientists

Asked if he had noted that of 155 Ph.D. Oxford graduates who had qualified since 1945 about 25 had settled in the US, Mr. J. Enoch Powell, Financial Secretary to the Treasury said he had been unable to identify the figures. The Advisory Council on Scientific Policy had reported that it found little evidence that an undue proportion of the better students were leaving the UK.

50% Rise in Scottish Use of Ammoniacal Liquor

EXCELLENT results achieved by Scottish farmers using crude ammoniacal liquor as a fertiliser for grassland over the past three years have led to a further expansion in the use of this material during 1956-57, states the Scottish Gas Board in its annual report. Quantity supplied during the 1956 season totalled 630,000 gall. an increase of 50 per cent over 1955.

The board's tar production in the year ended 31 March totalled 190,000 tons, of which 29 per cent was distilled at plants owned by the board. The remainder was disposed of through the co-operative tar scheme or sold to private distillers. Production of motor benzole increased to 45,000 gall., compared with 26,000 gall.

Talks on Windscale Accident

The question of responsibility for the accident at the No. 1 Windscale plant on 10 October is to be the subject of talks between the UK Atomic Energy Authority and the Institution of Professional Civil Servants. The Prime Minister has told the Institution that if after the talks there remained arguments which the institution would like to put to him, he would ask the Paymaster General to receive a deputation on his behalf.

LOW TEMPERATURE GAS SEPARATION

Purification of Hydrogen for Distillation

METHODS for purifying hydrogen prior to distillation at 20° Kelvin in a plant for the large-scale separation of deuterium were considered by Mr. W. H. Denton, Dr. B. Shaw and Dr. D. E. Ward in their paper on 'Purification of hydrogen for distillation'. Particular attention was given to ensuring continuous re-evaporation of solid deposits from the feed gas heat exchangers, especially in the range 63°K to 20°K where high deposition rates of solid nitrogen can occur.

For the operation of reversing exchangers for this duty a general theory was given. Taken in conjunction with the appropriate solid-vapour phase equilibria, this gave the limiting maximum operating temperature differences. It was shown that for hydrogen there would be supersaturation and/or formation of solid fog particles in the gas stream with possible adverse consequences.

A purification system was described consisting mainly of reversing heat exchangers, for the whole range 290°K to 20°K for a feed gas containing high concentrations of nitrogen and/or carbon monoxide, such as ammonia synthesis gas. Below 63°K (triple point of nitrogen) a reversing heat exchanger was used, followed by a system of switched dual units down to 20°K in the region where inversion of the phase equilibria occurred. Calculations of the extra refrigeration load imposed by the latter system were given, showing that it was acceptable in this particular case because of the very low metal specific heats in the temperature range just above 20°K. The merits of the plate-fin type heat exchanger, especially below 63°K, were discussed.

The first stage of an experimental plant, for testing these purification methods was described and results obtained to date were presented. Runs of up to 48 hours were carried out with a tubular, parallel flow, reversing heat exchanger down to 80°K with carbon dioxide as impurity. During an initial equilibrium period, particles of solid carbon dioxide were detected at 80°K in the otherwise purified gas stream. After longer periods the purification of the gas became practically complete, less than 0.25 p.p.m. carbon dioxide, and between 99.7 per cent and 99.9 per cent of the total carbon dioxide condensed in the plant was re-evaporated. Simple filters were used to protect the cold-end valves only but had an insignificant duty after the initial period was passed.

The effects of supersaturation and the influence of Reynolds number and different types of heat exchangers on controlling the deposition of solid particles were discussed.

Denton, *et al.*, stated that despite the much greater degree of supersaturation of impurities in hydrogen than in air, experiments showed that the reversing heat exchanger principle could be used for the continuous purification of hydrogen down to 80°K, containing CO_2, provided that suitably phased reversing valves were used to reduce gas flow surges.

Solid particles appeared in the gas stream but only during an initial equilibrium period when they were filterable. In the higher concentration regions solid deposits were loose and mechanical blowing-off was responsible for the removal of an appreciable part of the solid.

Bearing in mind that the present experimental heat exchangers were empty tubes which offered little resistance to the carrying down of solid particles to the lower temperature levels, since the total solid accumulation rate was no more than 10 p.p.m. out of a 0.4 per cent carbon dioxide feed, the prospects of developing reversing exchangers or ribbon packed regenerators for the successful low temperature purification of hydrogen appeared to be good; although the high solid deposition rates occurring with an ammonia synthesis gas feed would present special problems. Suitable types of fin geometries in plate-fin units or crimped ribbons in regenerators might be necessary to trap solid fog particles.

Although theoretical considerations showed that high Reynolds numbers did not overcome supersaturation tendencies, which depended principally on the physical properties of the gas mixture, turbulent flow might assist in driving solid particles towards the surfaces. Mechanical obstruction of the particles by suitable heat exchanger surfaces would probably be much more effective, these workers thought.

Complete inversion of the solid-vapour phase equilibria on approaching 20°K ruled out the use of reversing exchangers in this region, and this presented a problem not present in air separation plant. There was a natural compensation for this in that in this temperature region the specific heats of constructional metals were very low, well into the Debye T^3 region, so as to allow heat exchangers to be warmed up periodically without imposing unduly high refrigeration loads on a working plant.

The papers summarised here were presented at the recent London symposium on low temperature gas separation (CA, 7 *December, p.* 923).

Tonnage Air Separation Plants

IT WAS stated by Dr. P. M. Shuftan and Mr. A. G. Mackie in discussing 'Special problems arising in the design of tonnage air separation plants' that the Rescol process in its latest development produced simultaneously and at high purity gaseous and liquid oxygen in proportions which could be varied over a wide range, while being also suitable for the production of gaseous oxygen only at high or medium purity. The process there met the special problems arising in the design of tonnage oxygen plants.

In the latest development air is employed instead of nitrogen as the reflux medium and is known as the Rescol air process. Two air streams are used, one (LP air) for cold production, the other (IP air) providing the reflux for rectification, the ratio of these two streams depending on the oxygen purity required. Only one compressor is required, compared with two required for nitrogen reflux and, in addition, for a given power consumption more air is available for separation.

In order to ensure re-sublimation of impurities deposited on the packing, the regenerators must be 'balanced' and this is achieved by a purified high pressure (HP air) stream diverted round the regenerators. This method was adopted principally because expansion of the high pressure air in an engine provides a highly efficient and flexible source of cold for the production of the liquid oxygen (LO) fraction, which is one of the principal features of the Rescol process. At the same time, the expanded balancing air is invaluable for preheating the LP (and IP) air before expansion in the turbines.

The plant is also able to operate economically during extended periods of low demand by producing liquid oxygen which can be conveniently stored to meet occasional peak demands and to cover periods when the plant is shut down for routine maintenance.

Extra cold production and other important functions were achieved at high efficiency by compressing a small and variable proportion of the air to a high pressure and subsequently expanding it isentropically.

In view of the use of a single column, the operating pressures of the main air streams are lower than in other known air separation processes and this increases notably the degree of purification of the air to be separated, resulting in high utilisation and safety factors of the plant.

Features incorporated in the plant which are of special interest were noted by the authors.

In the compressor, the requirement of a bled stream is unusual. But as the ratio of IP to LP air determines rectification performance, control of the two streams within certain limits is essential. It is effected automatically by an Askania controller.

Stone packing is being used in the regenerators in preference to Fränk packing. Stones have a higher heat capacity and allow longer cycle times (about eight minutes), with small change-over losses, thereby minimising disturbances in the operation of the plant. Loss of air due to the change-over operation is between two and three per cent. Also, small temperature differences are achieved.

The equalisers used are stated to have

operated very satisfactorily with only a small pressure drop. They contain a lower bubble cap and an upper sieve tray. Concentration of CO_2 in the exit vapour is less than 0.5 v.p.m. Blockages due to traces of CO_2 deposited on the liquid air expansion valve have been overcome by filling the down-stream section of the filter candles with silica gel.

In the heat exchangers, on the oxygen side, the liquid is force-circulated to give high heat transfer rate together with adequate flushing of the evaporating surfaces.

The lower section of the rectification column has been designed for a higher vapour velocity than usual, and the tray spacing has been increased to compensate for the increased entrainment expected; weeping of the trays is thus avoided when IP turbines are operating. An oxygen purity of 99.65 per cent and nitrogen of 99.5 per cent purity has been achieved.

Safety of oxygen plants, and in particular of a plant based on the Rescol process was discussed by Shuftan and Mackie. The use of the turbo-compressor eliminates any hazard from oil or its decomposition products while the direct coolers remove water-soluble impurities such as ammonia. Alumina driers remove any traces of oil from the high-pressure air. In the Rescol process, liquid oxygen from the sump of the column is circulated through the absorbers, so that the concentration of contaminants can be directly controlled at the danger spot. The acetylene is usually held, it is stated, at 0.25 v.p.m. and the adsorbers changed one a week or when a concentration of 0.5 v.p.m. is reached (about $\frac{1}{10}$ of the solubility). As a further safety measure, a considerable excess of oxygen is circulated through the condensers to ensure that no local contaminant concentration can occur.

Considerable attention has been paid to insulation, Dr. Shuftan and Mr. Macwie report, since a reduction of 10 per cent of heat inleak corresponds to an extra production of about one ton a day of liquid oxygen on a 100-ton plant. Two types of insulation are quoted—fibrous material such as slag wool or powder, e.g. Perlite.

Operating data for 100- 200- and 300-ton Rescol plants under extreme conditions of operation were given.

If allowance is made for the fact that in all cases a certain amount of liquid oxygen is produced, it is found that the power consumption of the Rescol process compares favourably with that of other tonnage oxygen processes (0.535 to 0.745 for a 100-ton/day plant and 0.517 to 0.720 KWh/sm for a 300-ton/day plant).

Costs excluding compression to storage pressure were cited by the authors. These referred to the production of 99.5 per cent oxygen at atmospheric pressure, of which 7 per cent is obtained as liquid. Assuming steady demand at the rated output of the plants, cost of 1,000 cu. ft. O_2 from a 100-ton/day plant is 55d, from a 200-ton/day plant, just under 45d and for a 300-ton/day plant 40d.

Olefins from Petroleum Cracking

IT was the purpose of Mr. L. B. Baker in his paper on 'Low temperature recovery of olefins' to consider the methods employed in recovering ethylene and propylene in a number of plants, in which more than 2,000 tons a day of ethylene are produced, together with simultaneous recovery of other light hydrocarbons.

Excellent feedstock in the US is obtained from light paraffin hydrocarbons in natural gas. In Europe, noted Mr. Baker, the principal raw materials are the light petroleum fractions, and particularly those boiling between approximately 30°C and 200°C. In some instances refinery gas or coke oven gas provides useful sources of ethylene itself and of light paraffins for further cracking. The quantities available, however, are not sufficient, except possibly in the largest plants, to permit large-scale production of olefins on a sound economic basis.

Cracked gases are normally obtained at substantially atmospheric conditions and are freed of all but traces of very heavy hydrocarbons and contain little material boiling above 200°C. Ethylene output of commercial plants varies between 20 and 440 tons a day. There is wide variation in gas composition according to the raw material.

From light hydrocarbon mixtures the principal product for recovery is ethylene for use in the manufacture of ethylene oxide, polythene, ethyl alcohol and a wide range of other chemicals. For ethylene oxide production by the chlorhydrin process, purity of 80 to 85 per cent is required and for some polythene manufacturing processes, purity of above 99.5 per cent.

Rigid limits are set for impurities such as carbon monoxide and particularly for acetylene. Tolerance levels for acetylene in ethylene product for a number of processes range from 5 to 50 p.p.m.

Next important recovery product is propylene which may be used for *iso*-propyl alcohol manufacture or for polymerisation to dodecylene for production of detergent alkylate. Purity required for this product may be relatively low, approximately 90 to 95 per cent, with less emphasis on amounts of tolerated impurities such as methyl acetylene.

Production of olefin and di-olefin in typical plant

	Production tons/year
Ethylene	30,000
Propylene	32,000
Butadiene	4,300
Butylenes	16,100

Butadiene, produced in commercially important quantities from cracking, is recovered by solvent extraction. Low temperature recovery units, however, normally produce a mixed C_4 hydrocarbon product, which is used for fuel or further processing.

In Western Europe, the recent trend has been for large olefin recovery plants to be closely integrated with plants converting olefins into various chemical products and intermediates. They require uninterrupted olefin supplies of constant quality. In the US one plant uses an underground reservoir. The olefin recovery plants described by Mr. Baker are designed to ensure stable operations over very long periods without periodic shutdowns for cleaning and maintenance. The processing sequence for a low temperature separation unit is compression, gas treating drying and fractionation.

Carbon dioxide and hydrogen sulphide in pyrolysis gas are removed by washing with caustic soda solutions. Amine treatment is also used for hydrogen sulphide removal in some large recovery plants.

Drying of feed gases is essential. The customary method of drying the compressed gas is by fixed beds of solid desiccant, which require periodic regeneration.

In the demethaniser, hydrogen or methane together with inert gases such as carbon dioxide are removed from the feed-gas mixture. For production 99.9 per cent pure ethylene, methane in the demethaniser bottoms must be reduced to very low levels. In the de-ethaniser, ethylene, ethane and small amounts of acetylene are taken overhead, with C_3 and heavier hydrocarbons collecting at the bottom.

To produce ethylene of 99.5 per cent purity and above, the ethane content of the ethylene product is reduced to the requisite values by employing extra plates in the rectifying section of the ethylene tower. A secondary demethaniser is used to reduce the methane to the required amount.

Acetylene removal facilities are an important feature of low temperature olefin recovery units. Two currently practised methods are solvent washing at low temperatures and selective hydrogenation. In mild distillate cracking the concentration of acetylene in the ethylene product is approximately 0.3 mol per cent, while concentrations of from 5 to 25 p.p.m. only are allowed for ethylene oxide or polythene production.

For solvent washing acetone or dimethyl formamide can be used. Traces of solvent remaining in the ethylene are removed by activated charcoal.

The catalysts for selective hydrogenation require periodic regeneration for maintenance of high activity.

Because of the range of temperatures encountered in low temperature separation plants (approximately —200°F to +400°F with higher temperatures in the pyrolysis operations) and pressure ranges from atmospheric pressure to approximately 550 p.s.i. absolute, the materials of construction must be carefully selected. Grades of steel which have been found satisfactory for the abovementioned temperatures are reported.

These are:

Temperature	Material
Below —150°F	Austenitic stainless steel
—150°F to —50°F	3.5 per cent nickel steel
—50°F to —20°F	Aluminium killed steel
Above —20°F to +400°F	Carbon steel

With these materials adequate impact strengths are obtained under operating conditions of these plants.

NEW USES BEING FOUND FOR ORGANOTIN COMPOUNDS

ORGANOTIN research is now spreading of its own volition and this branch of chemistry is already of commercial interest, said Dr. Ernest S. Hedges, director, International Tin Research Council, recently. Dr. Hedges was discussing 'The scope of organotin compounds in industry' at a meeting in Frankfurt, Western Germany (see last week's CHEMICAL AGE, p. 930).

Surveying the history of organotin compounds, Dr. Hedges said they had been known for more than a century; Löwig prepared diethyltin in 1852 and in the following year Frankland prepared tetraethyltin.

It was not until the 1930s, however, that work in the US showed that the autocatalytic decomposition of some chlorinated organic compounds could be prevented by the addition of certain quadrivalent organotin compounds. During the next 10 years this led to a considerable consumption of tin in the p.v.c. industry.

Dr. Hedges said that it seemed to him at that time that a systematic study of organotin chemistry should provide substances of use in spheres other than metallurgical applications, such as plastics, paints, detergents, lubricants, fuels, agricultural chemicals, pharmaceutical products, rubber and textiles.

At the same time he was intrigued by the possibility of a new branch of chemistry based on tin. The special feature of organotin chemistry was not that tin was attached to carbon but that a tin atom took the place of a carbon atom.

Dutch Research Team

In 1949 Dr. Hedges discussed the subject with Dr. van der Kerk whom he invited to undertake this systematic study for the International Tin Research Council. During the past eight years Dr. van der Kerk had built up at Utrecht, Holland, a research team working solely on organotin chemistry.

Professor Lesbre, University of Toulouse, France, was also working on certain aspects of this subject, and arrangements had been for some theoretical aspects to be studied at English universities, particularly London, Southampton and Leicester.

On the subject of industrial applications, Dr. Hedges said there were two themes, (1) retarding the decomposition of certain chlorinated organic compounds and (2) biocidal properties.

Hundreds of tons of dibutyltin were used every year in p.v.c. manufacture and tetraphenyltin was being used in the US for preventing the autocatalytic decomposition of synthetic chlorinated transformer oils.

It was found that the addition of a small amount of dibutyltin dilaurate to chlorinated rubber paints prevented decomposition and liberation of hydrochloric acid. Paints so treated had been used with success on the exterior of some of the largest blocks of flats in London and in swimming pools throughout England.

Dibutyltin compounds had been used on a large scale for some years in the treatment of worm infections in poultry, said Dr. Hedges, but the most promising avenue for the development of this branch of organotin chemistry started from Dr. van der Kerk's observations on the biocidal properties of compounds in which one tin atom was linked directly with three carbon atoms. The lower trialkyltin and triaryltin compounds, for example, had been shown to be extremely powerful fungicides.

It was, however, necessary to adjust the relative toxicity of the compounds towards different forms of life, so as to be able to kill one form of life while leaving the others unharmed. 'Although we know some organotin compounds to be among the most powerful fungicides, most of them tend to kill the plant as well as the pest!'

The search was for greater selectivity. In this field the chemists of Farbwerke Hoechst had already made good progress.

There were clearly opportunities for improved fungicides and insecticides in the textile industries. Substances used must, however, be resistant to leaching and washing and must be harmless to the skin. These points were being investigated.

Tributyltin compounds were being used commercially to prevent the formation of bacterial slimes in paper making and also to prevent the formation of moulds on paints in damp situations. Practical trials were also being made for wood preservation.

Dr. Hedges also suggested that some compounds might find use in pharmaceutical products as well as in veterinary medicine. Another possibility was the production of polymers having new properties.

In conclusion Dr. Hedges recommended organotin chemistry, both as a subject for pure research in the universities and for practical investigations in industrial research laboratories. His final remarks were 'Generally the economics of a problem will have the last word. New products will be commercially successful only if they give a better service for the same cost or the same service for a lower cost. In such a field an important aim should be to devise more economical methods of manufacture, without which much other painstaking work may be ineffective.'

North-West Chemical Engineers Hear Papers on Pressure Vessels

PRESSURE vessels were discussed at a meeting of the Institution of Chemical Engineers, North-Western branch, held recently at the College of Science and Technology, Manchester. Two papers, 'Problems in the design of pressure vessels for the Calder Hall type of nuclear reactor,' by Mr. R. W. Lakin, and 'Non-ferrous pressure vessels,' by Mr. H. T. Bone, were read.

Mr. Lakin described a steel vessel required to contain a coolant gas at 50-300 p.s.i. and to enclose a cylindrical graphite core, 30-50 feet diameter and a similar height. The vessel designed for Calder Hall was 37 feet diameter, 70 feet high, 2 in. thick, with a working pressure of 100 p.s.i. Such vessels must be built from plate and welded on the site. Lloyds Register code had the preference over BS and API-ASME codes because the requirements could be discussed with Lloyds' surveyors and the requirements of the other codes could not be met. The problems of spheres, horizontal and vertical cylinders and the methods of supporting them were described, and Mr. Lakin dealt with end closures, stresses around the openings in the vessel and the properties of the thick plates. The inspection of the materials, particularly the welds, was also described.

Mr. H. T. Bone then discussed the uses and fabrication of copper, aluminium and their alloys. Vessels may be designed to BS1500 and the ASME code is available for use in design work. Metals and alloys are not affected by low temperatures, but aluminium vessels must be supported, even against the force of the wind, and they may be enclosed in a mild steel shell as support. The connections and closures to aluminium vessels are flanged with full-faced flanges. Soft gaskets are used; the bolts are manganese bronze, which may be cadmium plated to prevent electrolytic action. Aluminium vessels may be welded by the tungsten arc, the argon arc and by gas welding; the fluxes must be completely removed as they are corrosive. Manganese bronze vessels are cast successfully, but they shrink considerably during casting.

Standardisation in Analytical Laboratories

STANDARDISATION in the analytical laboratory was the subject of a discussion-meeting held by the Society for Analytical Chemistry in London on 4 December. Dr. J. R. Nicholls, a past-president, was in the chair. Discussion was opened by R. C. Chirnside (GEC Ltd.), L. S. Theobald (Imperial College), Dr. J. Haslam (ICI plastics division) and G. Ingram (Courtaulds).

The speakers discussed various aspects of standardisation of importance to all analytical laboratories. For the standardisation of volumetric solutions, the use of an ultimate standard such as silver, or standards based on sulphuric acid, sodium carbonate or borax, and on oxidising substances such as potassium dichromate and potassium permanganate or the use of pure metals were discussed. The value of 'standard' samples, e.g., 'BCS', was also mentioned.

The need for standardisation in connection with the new technique of spectroscopy, flame photometry, biological assay, radiochemistry, infra-red spectroscopy, etc., was considered. The meeting also discussed certain aspects of standardisation in relation to the practice of microchemical analysis.

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Carbon dioxide and hydrogen sulphide in pyrolysis gas are removed by washing with caustic soda solutions. Amine treatment is also used for hydrogen sulphide removal in some large recovery plants.

Drying of feed gases is essential. The customary method of drying the compressed gas is by fixed beds of solid desiccant, which require periodic regeneration.

In the demethaniser, hydrogen or methane together with inert gases such as carbon dioxide are removed from the feed-gas mixture. For production 99.9 per cent pure ethylene, methane in the demethaniser bottoms must be reduced to very low levels. In the de-ethaniser, ethylene, ethane and small amounts of acetylene are taken overhead, with C_3 and heavier hydrocarbons collecting at the bottom.

To produce ethylene of 99.5 per cent purity and above, the ethane content of the ethylene product is reduced to the requisite values by employing extra plates in the rectifying section of the ethylene tower. A secondary demethaniser is used to reduce the methane to the required amount.

Acetylene removal facilities are an important feature of low temperature olefin recovery units. Two currently practised methods are solvent washing at low temperatures and selective hydrogenation. In mild distillate cracking the concentration of acetylene in the ethylene product is approximately 0.3 mol per cent, while concentrations of from 5 to 25 p.p.m. only are allowed for ethylene oxide or polythene production.

For solvent washing acetone or dimethyl formamide can be used. Traces of solvent remaining in the ethylene are removed by activated charcoal.

The catalysts for selective hydrogenation require periodic regeneration for maintenance of high activity.

Because of the range of temperatures encountered in low temperature separation plants (approximately —200°F to +400°F with higher temperatures in the pyrolysis operations) and pressure ranges from atmospheric pressure to approximately 550 p.s.i. absolute, the materials of construction must be carefully selected. Grades of steel which have been found satisfactory for the above-mentioned temperatures are reported.

These are:

Temperature	Material
Below —150°F	Austenitic stainless steel
—150°F to —50°F	3.5 per cent nickel steel
—50°F to —20°F	Aluminium killed steel
Above —20°F to +400°F	Carbon steel

With these materials adequate impact strengths are obtained under operating conditions of these plants.

NEW USES BEING FOUND FOR ORGANOTIN COMPOUNDS

ORGANOTIN research is now spreading of its own volition and this branch of chemistry is already of commercial interest, said Dr. Ernest S. Hedges, director, International Tin Research Council, recently. Dr. Hedges was discussing 'The scope of organotin compounds in industry' at a meeting in Frankfurt, Western Germany (see last week's CHEMICAL AGE, p. 930).

Surveying the history of organotin compounds, Dr. Hedges said they had been known for more than a century; Löwig prepared diethyltin in 1852 and in the following year Frankland prepared tetraethyltin.

It was not until the 1930s, however, that work in the US showed that the autocatalytic decomposition of some chlorinated organic compounds could be prevented by the addition of certain quadrivalent organotin compounds. During the next 10 years this led to a considerable consumption of tin in the p.v.c. industry.

Dr. Hedges said that it seemed to him at that time that a systematic study of organotin chemistry should provide substances of use in spheres other than metallurgical applications, such as plastics, paints, detergents, lubricants, fuels, agricultural chemicals, pharmaceutical products, rubber and textiles.

At the same time he was intrigued by the possibility of a new branch of chemistry based on tin. The special feature of organotin chemistry was not that tin was attached to carbon but that a tin atom took the place of a carbon atom.

Dutch Research Team

In 1949 Dr. Hedges discussed the subject with Dr. van der Kerk whom he invited to undertake this systematic study for the International Tin Research Council. During the past eight years Dr. van der Kerk had built up at Utrecht, Holland, a research team working solely on organotin chemistry.

Professor Lesbre, University of Toulouse, France, was also working on certain aspects of this subject, and arrangements had been for some theoretical aspects to be studied at English universities, particularly London, Southampton and Leicester.

On the subject of industrial applications, Dr. Hedges said there were two themes, (1) retarding the decomposition of certain chlorinated organic compounds and (2) biocidal properties.

Hundreds of tons of dibutyltin were used every year in p.v.c. manufacture and tetraphenyltin was being used in the US for preventing the autocatalytic decomposition of synthetic chlorinated transformer oils.

It was found that the addition of a small amount of dibutyltin dilaurate to chlorinated rubber paints prevented decomposition and liberation of hydrochloric acid. Paints so treated had been used with success on the exterior of some of the largest blocks of flats in London and in swimming pools throughout England.

Dibutyltin compounds had been used on a large scale for some years in the treatment of worm infections in poultry, said Dr. Hedges, but the most promising avenue for the development of this branch of organotin chemistry started from Dr. van der Kerk's observations on the biocidal properties of compounds in which one tin atom was linked directly with three carbon atoms. The lower trialkyltin and triaryltin compounds, for example, had been shown to be extremely powerful fungicides.

It was, however, necessary to adjust the relative toxicity of the compounds towards different forms of life, so as to be able to kill one form of life while leaving the others unharmed. 'Although we know some organotin compounds to be among the most powerful fungicides, most of them tend to kill the plant as well as the pest!'

The search was for greater selectivity. In this field the chemists of Farbwerke Hoechst had already made good progress.

There were clearly opportunities for improved fungicides and insecticides in the textile industries. Substances used must, however, be resistant to leaching and washing and must be harmless to the skin. These points were being investigated.

Tributyltin compounds were being used commercially to prevent the formation of bacterial slimes in paper making and also to prevent the formation of moulds on paints in damp situations. Practical trials were also being made for wood preservation.

Dr. Hedges also suggested that some compounds might find use in pharmaceutical products as well as in veterinary medicine. Another possibility was the production of polymers having new properties.

In conclusion Dr. Hedges recommended organotin chemistry, both as a subject for pure research in the universities and for practical investigations in industrial research laboratories. His final remarks were 'Generally the economics of a problem will have the last word. New products will be commercially successful only if they give a better service for the same cost or the same service for a lower cost. In such a field an important aim should be to devise more economical methods of manufacture, without which much other painstaking work may be ineffective.'

North-West Chemical Engineers Hear Papers on Pressure Vessels

PRESSURE vessels were discussed at a meeting of the Institution of Chemical Engineers, North-Western branch, held recently at the College of Science and Technology, Manchester. Two papers, 'Problems in the design of pressure vessels for the Calder Hall type of nuclear reactor,' by Mr. R. W. Lakin, and 'Non-ferrous pressure vessels,' by Mr. H. T. Bone, were read.

Mr. Lakin described a steel vessel required to contain a coolant gas at 50-300 p.s.i. and to enclose a cylindrical graphite core, 30-50 feet diameter and a similar height. The vessel designed for Calder Hall was 37 feet diameter, 70 feet high, 2 in. thick, with a working pressure of 100 p.s.i. Such vessels must be built from plate and welded on the site. Lloyds Register code had the preference over BS and API-ASME codes because the requirements could be discussed with Lloyds' surveyors and the requirements of the other codes could not be met. The problems of spheres, horizontal and vertical cylinders and the methods of supporting them were described, and Mr. Lakin dealt with end closures, stresses around the openings in the vessel and the properties of the thick plates. The inspection of the materials, particularly the welds, was also described.

Mr. H. T. Bone then discussed the uses and fabrication of copper, aluminium and their alloys. Vessels may be designed to BS1500 and the ASME code is available for use in design work. Metals and alloys are not affected by low temperatures, but aluminium vessels must be supported, even against the force of the wind, and they may be enclosed in a mild steel shell as support. The connections and closures to aluminium vessels are flanged with full-faced flanges. Soft gaskets are used; the bolts are manganese bronze, which may be cadmium plated to prevent electrolytic action. Aluminium vessels may be welded by the tungsten arc, the argon arc and by gas welding; the fluxes must be completely removed as they are corrosive. Manganese bronze vessels are cast successfully, but they shrink considerably during casting.

Standardisation in Analytical Laboratories

STANDARDISATION in the analytical laboratory was the subject of a discussion-meeting held by the Society for Analytical Chemistry in London on 4 December. Dr. J. R. Nicholls, a past-president, was in the chair. Discussion was opened by R. C. Chirnside (GEC Ltd.), L. S. Theobald (Imperial College), Dr. J. Haslam (ICI plastics division) and G. Ingram (Courtaulds).

The speakers discussed various aspects of standardisation of importance to all analytical laboratories. For the standardisation of volumetric solutions, the use of an ultimate standard such as silver, or standards based on sulphuric acid, sodium carbonate or borax, and on oxidising substances such as potassium dichromate and potassium permanganate or the use of pure metals were discussed. The value of 'standard' samples, e.g., 'BCS', was also mentioned.

The need for standardisation in connection with the new technique of spectroscopy, flame photometry, biological assay, radiochemistry, infra-red spectroscopy, etc., was considered. The meeting also discussed certain aspects of standardisation in relation to the practice of micro-chemical analysis.

NEW PREFINISHING PROCESS DEVELOPED FOR ALUMINIUM

ALUMINIUM castings are being given a COP (chromate oxidisation) coat by a new type of plant, recently installed by Woods of Colchester Ltd., an associate company of General Electric Co. Ltd. The process is stated to replace prime-painting and stoving.

Two men operate the plant which has an output exceeding that of seven painters, previously engaged on prefinishing. Production costs are cut therefore and better products result, for the treatment provides greater resistance to corrosion and an improved bond for the finishing paint used on fans.

Whereas paint, lacquer and enamel are liable to lose their adhesion to aluminium and aluminium alloys, and consequently fail by peeling, flaking or being readily chipped, COP has been found to replace the natural oxide film with an insoluble, granular aluminium oxide coating which provides improved paint bonding and anti-corrosion resistance.

Hitherto used extensively for treating aluminium sheet and panels, it has not previously been used for castings. The company says that the solution has no harmful effects on ferrous or copper alloy inserts which have been moulded in the castings.

The Woods installation is the first continuous plant to be designed for use in conjunction with the COP process. Gravity, pressure and sand castings and sheet aluminium components are being treated.

The Woods plant consists of three tanks. The first holds 1,000 gal. of COP solution, the second is a running cold water rinse of 500 gal. capacity, and the third a hot water rinse of the same capacity. Castings are suspended and travel on a conveyor at 6½ in. a minute. They are suspended in the COP solution for 15 minutes and then pass through a cold water curtain which reduces the amount of drag-out from the solution before being dipped successively into the running cold water rinse and hot water rinse tanks. The hot water rinse ensures the necessary rapid drying of the castings.

Both the COP and hot water tanks are steam heated, the former to between 92°C and 98°C and the latter to 70°C. Compressed air is used to agitate the COP solution and cold water rinse. Strength of the solution is tested twice a day.

The plant was designed in co-operation with Woods engineers by Jenolizing Co. Ltd., which company provides the COP solution.

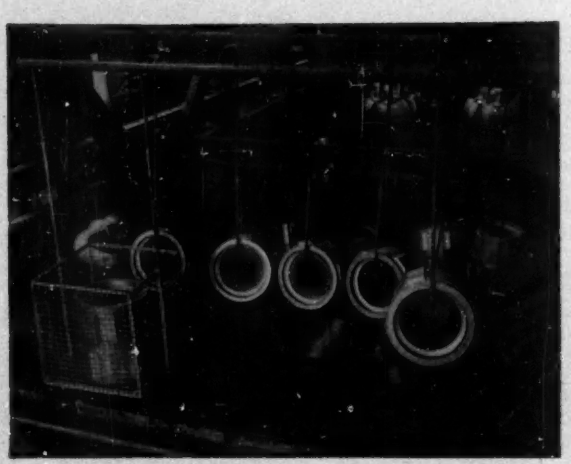
Influence of Silicon and Chromium on Austenite

INVESTIGATIONS by S. Drapal (*Hutnické Listy*, 1957, **xii**, No. 10, 899) on the influence of silicon and chromium on eutectoid isothermal transformation of austenite has shown that the transformation starts with the formation of ferrite. Ferrite starts to form on the austenite-graphite boundary on the one side and on that between the grains of austenite in regions around the 'grains' of graphite on the other.

According to Drapal, in cast irons with low chromium content, austenite can completely transform into ferrite and graphite in a certain region below the lower eutectoid temperature.

On considerable under-cooling of austenite, after a certain degree of transformation being reached, the formation of perlite occurs. The quantity of perlite existing in the structure at the end of the austenite transformation increases with decreasing transformation temperature.

Growing silicon content is reported to moderately shorten the incubation period and to exaggerate the portion of ferrite in the lower temperature range after the austenite transformation is finished. Growing chromium content considerably extends the incubation period, it shortens the range between the beginning of ferrite formation and that of perlite and diminishes the quantity of ferrite after the austenite transformation is finished. On exceeding a certain chromium concentration in cast iron, the austenite transformation into ferrite and graphite is no longer possible.



In a 44-hour week, 13 tons of impellers, motor carcasses, end covers and other aluminium components are handled by the chromate oxidisation plant

Preparing Small Amounts of Titanium Trichloride

ARC reduction of titanium tetrachloride with hydrogen can be carried out on a laboratory scale to produce about a gram of pure (99.8 per cent purity) dry titanium trichloride per hour. Reporting this work T. R. Ingraham, K. W. Downes and P. Marien, Mines Branch Laboratories, Department of Mines and Technical Survey, Ottawa, Canada, state that they have used a continuous closed system process with a circulating atmosphere of $TiCl_4$ vapour and H_2. Monatomic hydrogen created at an electric arc reacts with the tetrachloride to form titanium trichloride and hydrogen chloride gas.

Heated elemental titanium in the system reduces the titanium tetrachloride to a mixture of titanium trichloride and titanium dichloride. These convert the hydrogen chloride gas back to molecular hydrogen and regenerate titanium tetrachloride. The trichloride is carried down by the circulating gas stream into an air-tight container to give brownish-red crystals initially, later changing to a stable purple colour.

A heavily damped, high-voltage, oscillatory spark discharge is described as the most effective arc system. For highest conversion, hydrogen pressures of between 4 and 5 mm. of mercury are recommended and $TiCl_4$ pressures of 10 to 13 mm.

Titanium is stated to be preferable to aluminium or lead as with clean treated titanium, intermediate reactions with titanium tetrachloride assist in the production of the trichloride. The best temperature for the titanium is said to be about 460°C providing more trichloride than dichloride at the surface of the metal, efficient regeneration of hydrogen from hydrochloride and optimum rate of titanium trichloride formation at the arc.

New Solder Process for Aluminium

ACCORDING TO Bell Telephone Laboratories of the US, flux and vigorous abrasion are no longer required to bond aluminium. It is also claimed that its solder will wet the surface of the metal even though rolling mill oils and the surface oxide haven't been removed.

The Bell solder is composed of zinc chiefly and can be alloyed with small amounts of aluminium and magnesium.

Obituary

MR. HENRY CHRISTOPHER GANT, aged 61, who had been associated with Cyanamid of Gt. Britain (formerly Cyanamid Products Ltd.) for over 37 years, and had been a director of the company since 1927. He was largely responsible for the early introduction of the products of the American Cyanamid Co. to British users and for the purchase of a large volume of chemical products in the UK for the US company. Mr. Gant also travelled extensively on the Continent as a special representative of the American Cyanamid Co. In the early days of the development of froth-flotation of minerals he worked closely with the technical staff of the great Commonwealth mining companies.

Overseas News

VENEZUELA'S PETROCHEMICAL COMPLEX ON STREAM SHORTLY

ON stream shortly will be the first units of the Venezuelan Government's £100 million petrochemical complex at Moron, North Venezuela. The first section, built at a cost of about £35 million, includes a 3,000-barrel-per-day experimental petroleum refinery, caustic soda-chlorine units, and synthetic fertiliser facilities. Work started on the site in 1955 and construction began in earnest 18 months ago.

By January next year the second £35 million stage will be well under way and is due for completion at the end of 1958. This section will include manufacture of explosives, insecticides, fungicides, and a national natural gas pipe-line network. The third stage is due to be completed at a cost of £50 million in 1960. A full scale refinery of 200,000-barrel-per-day capacity is planned, together with plants to produce synthetic rubber, plastics, synthetic fibres and related products.

The natural gas line is under construction to Moron. It will be 43 miles long and have a daily capacity of 2.3 million cubic metres.

The caustic-chlorine plant, which is German-built, has a daily capacity of 30 tons of chlorine and 34 tons of caustic soda (96 per cent). The fertiliser units are Montecatini-designed. They will produce ammonia, nitric acid, sulphuric acid (200 tons a day), ammonium nitrate, ammonium sulphate, urea, phosphoric acid and superphosphate.

Epilene C—New Polythene Resin

Latest member of the polythene family is Epilene C, developed by Eastman Chemical Products, Inc., US. It is described as having many of the properties of plastic-grade resins, yet handles like a moderate to high melting point wax. Due to this, Epilene C can be used as a melt. At 300°F the viscosity of the material is 8,000 centipoises. Addition of paraffin only reduces the viscosity to 1,300 centipoises at 300°F, the company reports.

Uses suggested for the resin are melt casting. With or without colouring agents Epilene C is stated to form relatively hard, tough cast or slush-moulded objects. Protective coatings can be formed when the material is used as a hotdip, and it can be used to coat paper. Conventional wax-coating machines can be used with only slight modifications. A better bond between coating and paper is obtained by using a hot melt.

New Method of Nitrating Polyalcohols

A new method for the nitration of glycerine, glycol and allied products is claimed by Nitroglycerin Aktiebolaget of Sweden. Known as 'injector nitration' the new process is reported to have operated successfully in a test scale plant (1,650 lb. per hour) for over a year. The product as a non-explosive spent acid emulsion is transferred by an injector to a separate housing where the ester is removed by a centrifugal separator running at high speed without direct supervision. Safety as well as production cost advantages are claimed for the process, which is covered by Swedish and foreign patents.

Lebanon Factory to Produce Sulphuric Acid

A chemical factory, reported under construction at Batroun, North Lebanon, is expected to be in production by early 1958. It is intended to produce 50 tons of sulphuric acid a day and 4,000 tons of superphosphate a month. Although it is still uncertain, Jordan appears to be the most likely source of phosphate rock.

French Chemical Industry Prospects

Results of the investigations by a committee of the French State Planning Commission of the French chemical industry's prospects have now been published. These indicate that the value of French chemical output should rise from £700 million in 1954 to £1,040 million in 1961, while the volume produced will be 73 per cent up over the eight years.

It is also stated that the industry's favourable external balance will rise from £35 million in 1956 to £96 million in 1961.

French chemical exports over the next five years should increase by 44 per cent, but imports should decline by 18 per cent. The decline in imports will rest with the development of the by-products of the Lacq natural gas deposits, particularly sulphur.

A £320 million investment plan is presupposed in the committee's forecast, half to be financed by the industry and half by resort to the money market.

Hercules Polypropylene Unit Operating

The first commercial polypropylene unit in North America is being operated by Hercules Powder Co. The plant is at Parlin, New Jersey, where Hercules are manufacturing Ziegler-type polythene. Capacity of the polypropylene plant is 20 million lb. a year. Propylene is being obtained from the new Sinclair chemical facilities now being built at Marcus Hook.

Commercial distribution is due to begin in January with the starting price of 65 cents per lb. This price is expected to drop rapidly as production increases.

Heavy demand is expected by the company, because of this polymer's desirable properties, tensile strength, temperature resistance and stiffness compared with any polythene. Two primary outlets are injection moulding and hot water piping, while potential outlets are in film and fibres.

To date no other US producer appears to be undertaking polypropylene manufacture. Phillips Chemicals have reported that they do not contemplate commercial production of polypropylene or polyisobutylene for at least a year. However, Du Pont and others are known to be studying polyolefins other than polythene, but no commercial plans have been reported.

Prospecting for Potassic Minerals in Italy

Some 50 permits to prospect for potassic minerals, covering an area of about 150,000 hectares, are at present in force in Sicily. The principal operators in this field are Edison, Societa' Trinacria, Montecatini, and ENI. Trinacria is associated with French and German interests.

The local authorities are looking with particular favour upon those companies which intend to build in Sicily plants for processing potassium salts on the spot. The companies that have, so far, complied with this wish are: Montecatini (who are building a large plant at Castelfranco), Societa' Trinacria (planning a plant near Enna), and SINCAT (who are building a plant at Priolo).

It is expected that when all the planned plants are ready, Sicily will not only be able to cover its own needs in potassic fertilisers, but will also export a considerable quantity.

Monsanto to Invest in Argentina

In a recent announcement made in Buenos Aires, Monsanto Chemicals of St. Louis, US, and the Norton Co. of Massachusetts, US, stated that they are each to invest $2.8 million in Argentina for the production of plastics and refractories.

New Dolomite Treatment Plant

Iscor's Mooiplas dolomite crushing and washing plant has been officially put into operation by Dr. C. M. Kruger, general manager of Iscor. The plant, the second of its type that Edward L. Bateman Ltd., of South Africa, have supplied to Iscor, has cost an estimated £325,000.

Deposits of dolomite at Mooiplas have proved to be of high-purity. The plant has been designed to operate at a feed rate of 350 tons an hour, and, to ensure minimum delay in the turn around of transport loading out, the shuttle conveyers from the stockpile to the railway weighbridge are designed to deliver 500 tons of material an hour.

Dutch Ultra-centrifuge Technique for Uranium

Research now being carried out at the Reactor Centrum Nederland, the Dutch Institute for the Development of Nuclear Science for Peaceful Purposes, under the direction of Professor Kistemaker, indicates that an ultra-centrifuge operating at very high speeds may be used to separate uranium 235 from natural uranium.

The preliminary experiments suggest

that the method may prove to be a considerably cheaper method of concentrating uranium 235, present in the proportion of one part in each 140 parts in natural uranium, than the gaseous diffusion process at present in use in the UK and the US.

In the gaseous diffusion process, considerable power is required in pumping uranium (as gaseous uranium hexafluoride) through a series of thousands of permeable plastic membranes through which the light uranium 235 atoms pass more easily than the heavier uranium 238 atoms which are present in greater quantity. In the ultra-centrifuge process the heavier uranium 238 atoms are stated to be thrown outwards more readily than the lighter uranium 235 atoms. The latter can be collected as a residue after prolonged centrifuging. As relatively few centrifuge units are required, considerably less power is required.

Hoechst Polypropylene and Teflon Production

A large-scale plant at Farbwerke Hoechst AG for polypropylene production is coming on stream. The company have been producing polypropylene on a pilot plant with a monthly capacity of 20 tons. The capacity of the large-scale plant is 700 tons monthly.

Hoechst have been licensed by E.I. Du Pont de Nemours and Co. Inc. to make Teflon, Du Pont's polytetrafluoroethylene.

Cellulose Film Production in Holland

N. V. Hollandsche Kunstzijde Industrie, a subsidiary of the AKU concern, has set up Holland's first cellulose-type film manufacturing factory at Breda. The company will have the manufacturing experience of the AKU Italian subsidiary, Italo Olandese Enka SpA, while Transparent Paper Ltd., London, is to provide technical 'know-how'. Production will be of the order of 35 tons weekly.

Japanese Synthetic Rubber Plant

Authorisation has now been received from the Japanese Government by Japanese Geon Co. Ltd. (Nippon Geon KK) for the setting up of a synthetic rubber plant in Kawasaki, near Tokyo. Annual capacity of the plant will total 8,500 tons, made up of 3,000 tons of GR-S, 2,800 tons of GR-S-latex, 1,200 tons of high-grade styrene rubber and 1,500 tons of nitrile rubber and latex. Technical 'know-how' is being provided by Goodrich Chemical Co.

Capital investment in the plant is around 1,700 million yen (about £1.7 million). Production is due to start in the first half of 1959.

Japanese Geon Co. Ltd. was formed in April 1950 by the Furukawa concern and B. F. Goodrich Chemical Co., US.

Graphite Production in France

The only important manufacturer of reactor-grade graphite in France is Pechiney of Paris.

Production of this graphite is from petroleum coke which is graphitised by a patented French process and simultaneous treatment with halogenated compounds freed of undesirable impurities.

Pechiney's capacity for reactor grade graphite is about 5,000 tons a year for the French Atomic Energy Commission.

Under France's five-year plan (1958–1962) output of high purity graphite is destined to be 17,000 tons.

According to Pechiney's graphite expert, Jean-Rien Saverny, the company is in a position and is prepared to supply high-grade graphite abroad.

Processing of reactor-grade graphite is carried out by Schneider-Creuzot who are supplying the French Atomic Energy Commission with fabricated graphite pieces.

Although France has large deposits of graphite in Madagascar, Pechiney are said to prefer to produce the graphite from petroleum coke.

Finns Negotiating for Uranium

Voimayhoistys Ydin, a Finnish association formed by industry to study nuclear energy problems, is considering the building of a graphite reactor for experimental purposes. They have been negotiating with several countries about the purchase of the necessary uranium, 1,500 kilos.

ICI ANZ's Hypochlorite Plant in Operation

Production of sodium hypochlorite has now been begun by ICI of Australia and New Zealand at Launceston, Tasmania. The new plant will supply all Tasmania's needs. Previously supplies were obtained from the Yarraville (Victoria) plant.

Growing demand in Tasmania together with transport problems, has made installation of the plant desirable. The demand is expected to continue increasing over the next five years. Raw materials for the plant will be chlorine from Yarraville and solid caustic soda from Osborne in South Australia. The final product will be processed in the new plant, which will produce the sodium hypochlorite for either bulk distribution or in packages.

SA Increases Duty on Synthetic Resins

South African Government Order No. 1803 brings into operation to the full extent the suspended duty provided for in the Customs Tariff on certain kinds of artificial resins in bulk. They are:

Urea formaldehyde; melamine formaldehyde; alkyd; epoxy esters; modified resins (including ester gums, modified cresylic, modified phenolic resins and resinates); pure phenolic (including oil-soluble types); polyvinyl acetate; and polyester.

Minimum duty is now nil, intermediate duty nil and maximum duty five per cent, plus an operative suspended duty of 15 per cent.

Canadian Oxygen Companies' Announce Expansion Plans

Liquid Carbonic Canadian Corporation, Ltd. and its associated company, Imperial Oxygen, Ltd., are to expand their facilities across Canada, following acquisition of the two companies by General Dynamics Corporation. Among expansion plans is a $1 million plant at Weston, Ont., with a daily capacity of 17 tons of liquid oxygen, nitrogen and argon.

Italian Mission Visits Bolivia

A group of Italian industrialists have discussed with the Bolivian Ministry of Economy the possibility of opening plants for the manufacture of cement at Cochabamba and Santa Cruz and others for sulphuric acid and calcium carbide.

Hungary's Expansion Rate Slackens

RECENT reports on Hungary's plastics industry suggest that the rate of expansion has slackened. In some instances, some projects have had to be shelved for the time being.

With regard to chemical production of resins by the chemical combine of Theiss, plant construction is in an early stage. It was due to start this year and is understood to be going ahead with support from the Soviet Union.

The pipeline from Rumania which will provide natural gas, has been started. The natural gas will be partially acetylated to give polyvinyl chloride and solvents. The p.v.c. plant is to have a yearly capacity of 6,000 tons. The gas will also be used to make synthesis gas for the production of nitrogenous fertilisers.

A p.v.c. plant will be set up with 'know-how' provided by East Germany. A new Hungarian process for the partial oxidation of natural gas to acetylene developed by the Hungarian Research Institute for the petroleum and natural gas industry at Veszprém will be used.

An experimental plant is under test at Buciumen near Bucharest. Work has started on the p.v.c. plant of Hungarian Chemical Co. (Hungaria Vegyimüvek) in Budapest. It will use the process developed by the Budapest Plastics Institute for the production of polyvinyl chloride from carbide. Yearly capacity of the plant is 300 to 400 tons. The plant is thought to be about half finished now.

In the same works there is a plant for the production of caprolactam from phenol with a yearly capacity of 300 to 500 tons. It will use a process developed by the Budapest Research Institute for organic chemistry, and exploit the experience from the Leuna works. This plant should be finished this year. No plans for the production of caprolactam have been made by the Theiss combine.

The caprolactam produced will go to make Perlon at the Hungarian Viscose Works (Magyar Viszkóza-Murek) in Nyergesugfalu.

Capacity of the plant for Perlon staple fibre will be 300 tons in 1958. This capacity will be increased to 1,000 tons a few years hence when Perlon monofilament will be produced. This will require a corresponding increase in the caprolactam plant in Budapest.

There are suggestions that the Hungarian Chemical Co. will build a chlorinated rubber plant, using chlorine from alkali electrolysis.

RAMSAY CHEMICAL DINNER





At the Ramsay dinner, l. to r., Lady Hutchison, Sir William Hutchison, Mrs. Leonard and Julian M. Leonard, past SCI president; Mrs. Robertson, Mrs. Hirst, Professor E. L. Hirst and Professor J. Monteith Robertson

IN keeping with the traditions of the Ramsay Chemical Dinners the guest of honour at this year's dinner in the Central Hotel, Glasgow, on 5 December was a person of distinction with no connection with chemistry. On this occasion the guest was Sir William Hutchison, president of the Scottish Academy.

Proposing the toast of the 'Profession of Chemistry', Sir William said that today so much knowledge of so many of the arts was being broadcast that although we could not all be Leonardo da Vincis, we could at least have the breadth of mind to understand both the arts and the sciences.

The chairman, Mr. Julian M. Leonard, immediate past president Society of the Chemical Industry, replied. He regretted that the president of his society, Mr. H. Greville Smith of Canadian Industries Ltd., Montreal, had been unable to attend. As a Canadian it was a long journey for Mr. Smith to have to make to attend their dinner in Glasgow.

The toast of 'the guests' was proposed by Dr. A. Kent and replied to by Professor E. L. Hirst, president of the Chemical Society.

Dancing followed the dinner.

The Ramsay dinner was held under the auspices of the Alchemists' Club, Glasgow University; Society for Analytical Chemistry (Scottish section); Andersonian Chemical Society; Anthraquinone Club; Ardeer Chemical Club; Chemical Society; Institution of Chemical Engineers (Scottish group); Institute of Fuel (Scottish section); Society of Chemical Industry (Glasgow section); Royal Institute of Chemistry (Glasgow and West of Scotland section); Institution of the Rubber Industry (Scottish section); Oil and Colour Chemists' Association (Scottish section); Plastics Institute (Scottish section); Society of Dyers and Colourists (Scottish section).

NPL Build Hardness Calibration Machine

THE National Physical Laboratory has built a machine to calibrate hardness blocks and provide a national standard of hardness. The machine is to provide a standard for the Vickers hardness scale but it is hoped eventually to provide a standard also for the Rockwell scale which is widely used in industry.

The NPL machine uses a diamond pyramid which can be loaded with 30, 50, 100 or 120 kg. correct to 1 part in 30,000 or better. The width of the indentation is measured to better than 10 millionths of an inch using a microscope and a specially designed lighting system. From this the diamond pyramid number can be calculated. The machine is accurate to 5 d.p.n. units.

Chemical Packages of the Future?

SOME of the wide variety of containers used by ICI Ltd. to package chemicals both for industry and retail sale was shown at a special exhibition held in the cinema at Imperial Chemical House, London, last week. Particularly noticeable was the use of colour on paper sacks, some of which had polythene linings. Also of interest was the moulded isocyanates container for the protection of fine chemicals contained in glass laboratory ware.

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that the method may prove to be a considerably cheaper method of concentrating uranium 235, present in the proportion of one part in each 140 parts in natural uranium, than the gaseous diffusion process at present in use in the UK and the US.

In the gaseous diffusion process, considerable power is required in pumping uranium (as gaseous uranium hexafluoride) through a series of thousands of permeable plastic membranes through which the light uranium 235 atoms pass more easily than the heavier uranium 238 atoms which are present in greater quantity. In the ultra-centrifuge process the heavier uranium 238 atoms are stated to be thrown outwards more readily than the lighter uranium 235 atoms. The latter can be collected as a residue after prolonged centrifuging. As relatively few centrifuge units are required, considerably less power is required.

Hoechst Polypropylene and Teflon Production

A large-scale plant at Farbwerke Hoechst AG for polypropylene production is coming on stream. The company have been producing polypropylene on a pilot plant with a monthly capacity of 20 tons. The capacity of the large-scale plant is 700 tons monthly.

Hoechst have been licensed by E.I. Du Pont de Nemours and Co. Inc. to make Teflon, Du Pont's polytetrafluoroethylene.

Cellulose Film Production in Holland

N. V. Hollandsche Kunstzijde Industrie, a subsidiary of the AKU concern, has set up Holland's first cellulose-type film manufacturing factory at Breda. The company will have the manufacturing experience of the AKU Italian subsidiary, Italo Olandese Enka SpA, while Transparent Paper Ltd., London, is to provide technical 'know-how'. Production will be of the order of 35 tons weekly.

Japanese Synthetic Rubber Plant

Authorisation has now been received from the Japanese Government by Japanese Geon Co. Ltd. (Nippon Geon KK) for the setting up of a synthetic rubber plant in Kawasaki, near Tokyo. Annual capacity of the plant will total 8,500 tons, made up of 3,000 tons of GR-S, 2,800 tons of GR-S-latex, 1,200 tons of high-grade styrene rubber and 1,500 tons of nitrile rubber and latex. Technical 'know-how' is being provided by Goodrich Chemical Co.

Capital investment in the plant is around 1,700 million yen (about £1.7 million). Production is due to start in the first half of 1959.

Japanese Geon Co. Ltd. was formed in April 1950 by the Furukawa concern and B. F. Goodrich Chemical Co., US.

Graphite Production in France

The only important manufacturer of reactor-grade graphite in France is Pechiney of Paris.

Production of this graphite is from petroleum coke which is graphitised by a patented French process and simultaneous treatment with halogenated compounds freed of undesirable impurities.

Pechiney's capacity for reactor grade graphite is about 5,000 tons a year for the French Atomic Energy Commission.

Under France's five-year plan (1958–1962) output of high purity graphite is destined to be 17,000 tons.

According to Pechiney's graphite expert, Jean-Rien Saverny, the company is in a position and is prepared to supply high-grade graphite abroad.

Processing of reactor-grade graphite is carried out by Schneider-Creuzot who are supplying the French Atomic Energy Commission with fabricated graphite pieces.

Although France has large deposits of graphite in Madagascar, Pechiney are said to prefer to produce the graphite from petroleum coke.

Finns Negotiating for Uranium

Voimayhoistys Ydin, a Finnish association formed by industry to study nuclear energy problems, is considering the building of a graphite reactor for experimental purposes. They have been negotiating with several countries about the purchase of the necessary uranium, 1,500 kilos.

ICI ANZ's Hypochlorite Plant in Operation

Production of sodium hypochlorite has now been begun by ICI of Australia and New Zealand at Launceston, Tasmania. The new plant will supply all Tasmania's needs. Previously supplies were obtained from the Yarraville (Victoria) plant.

Growing demand in Tasmania together with transport problems, has made installation of the plant desirable. The demand is expected to continue increasing over the next five years. Raw materials for the plant will be chlorine from Yarraville and solid caustic soda from Osborne in South Australia. The final product will be processed in the new plant, which will produce the sodium hypochlorite for either bulk distribution or in packages.

SA Increases Duty on Synthetic Resins

South African Government Order No. 1803 brings into operation to the full extent the suspended duty provided for in the Customs Tariff on certain kinds of artificial resins in bulk. They are:

Urea formaldehyde; melamine formaldehyde; alkyd; epoxy esters; modified resins (including ester gums, modified cresylic, modified phenolic resins and resinates); pure phenolic (including oil-soluble types); polyvinyl acetate; and polyester.

Minimum duty is now nil, intermediate duty nil and maximum duty five per cent, plus an operative suspended duty of 15 per cent.

Canadian Oxygen Companies' Announce Expansion Plans

Liquid Carbonic Canadian Corporation, Ltd. and its associated company, Imperial Oxygen, Ltd., are to expand their facilities across Canada, following acquisition of the two companies by General Dynamics Corporation. Among expansion plans is a $1 million plant at Weston, Ont., with a daily capacity of 17 tons of liquid oxygen, nitrogen and argon.

Italian Mission Visits Bolivia

A group of Italian industrialists have discussed with the Bolivian Ministry of Economy the possibility of opening plants for the manufacture of cement at Cochabamba and Santa Cruz and others for sulphuric acid and calcium carbide.

Hungary's Expansion Rate Slackens

RECENT reports on Hungary's plastics industry suggest that the rate of expansion has slackened. In some instances, some projects have had to be shelved for the time being.

With regard to chemical production of resins by the chemical combine of Theiss, plant construction is in an early stage. It was due to start this year and is understood to be going ahead with support from the Soviet Union.

The pipeline from Rumania which will provide natural gas, has been started. The natural gas will be partially acetylated to give polyvinyl chloride and solvents. The p.v.c. plant is to have a yearly capacity of 6,000 tons. The gas will also be used to make synthesis gas for the production of nitrogenous fertilisers.

A p.v.c. plant will be set up with 'know-how' provided by East Germany. A new Hungarian process for the partial oxidation of natural gas to acetylene developed by the Hungarian Research Institute for the petroleum and natural gas industry at Veszprém will be used.

An experimental plant is under test at Buciumen near Bucharest. Work has started on the p.v.c. plant of Hungarian Chemical Co. (Hungaria Vegyimüvek) in Budapest. It will use the process developed by the Budapest Plastics Institute for the production of polyvinyl chloride from carbide. Yearly capacity of the plant is 300 to 400 tons. The plant is thought to be about half finished now.

In the same works there is a plant for the production of caprolactam from phenol with a yearly capacity of 300 to 500 tons. It will use a process developed by the Budapest Research Institute for organic chemistry, and exploit the experience from the Leuna works. This plant should be finished this year. No plans for the production of caprolactam have been made by the Theiss combine.

The caprolactam produced will go to make Perlon at the Hungarian Viscose Works (Magyar Viszkóza-Murek) in Nyergesugfalu.

Capacity of the plant for Perlon staple fibre will be 300 tons in 1958. This capacity will be increased to 1,000 tons a few years hence when Perlon monofilament will be produced. This will require a corresponding increase in the caprolactam plant in Budapest.

There are suggestions that the Hungarian Chemical Co. will build a chlorinated rubber plant, using chlorine from alkali electrolysis.

RAMSAY CHEMICAL DINNER





At the Ramsay dinner, l. to r., Lady Hutchison, Sir William Hutchison, Mrs. Leonard and Julian M. Leonard, past SCI president; Mrs. Robertson, Mrs. Hirst, Professor E. L. Hirst and Professor J. Monteith Robertson

IN keeping with the traditions of the Ramsay Chemical Dinners the guest of honour at this year's dinner in the Central Hotel, Glasgow, on 5 December was a person of distinction with no connection with chemistry. On this occasion the guest was Sir William Hutchison, president of the Scottish Academy.

Proposing the toast of the 'Profession of Chemistry', Sir William said that today so much knowledge of so many of the arts was being broadcast that although we could not all be Leonardo da Vincis, we could at least have the breadth of mind to understand both the arts and the sciences.

The chairman, Mr. Julian M. Leonard, immediate past president Society of the Chemical Industry, replied. He regretted that the president of his society, Mr. H. Greville Smith of Canadian Industries Ltd., Montreal, had been unable to attend. As a Canadian it was a long journey for Mr. Smith to have to make to attend their dinner in Glasgow.

The toast of 'the guests' was proposed by Dr. A. Kent and replied to by Professor E. L. Hirst, president of the Chemical Society.

Dancing followed the dinner.

The Ramsay dinner was held under the auspices of the Alchemists' Club, Glasgow University; Society for Analytical Chemistry (Scottish section); Andersonian Chemical Society; Anthraquinone Club; Ardeer Chemical Club; Chemical Society; Institution of Chemical Engineers (Scottish group); Institute of Fuel (Scottish section); Society of Chemical Industry (Glasgow section); Royal Institute of Chemistry (Glasgow and West of Scotland section); Institution of the Rubber Industry (Scottish section); Oil and Colour Chemists' Association (Scottish section); Plastics Institute (Scottish section); Society of Dyers and Colourists (Scottish section).

NPL Build Hardness Calibration Machine

THE National Physical Laboratory has built a machine to calibrate hardness blocks and provide a national standard of hardness. The machine is to provide a standard for the Vickers hardness scale but it is hoped eventually to provide a standard also for the Rockwell scale which is widely used in industry.

The NPL machine uses a diamond pyramid which can be loaded with 30, 50, 100 or 120 kg. correct to 1 part in 30,000 or better. The width of the indentation is measured to better than 10 millionths of an inch using a microscope and a specially designed lighting system. From this the diamond pyramid number can be calculated. The machine is accurate to 5 d.p.n. units.

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Chemist's Bookshelf

HYGIENE IN INDUSTRY

INDUSTRIAL TOXICOLOGY. By *Lawrence T. Fairhall*. Williams and Wilkins, and Bailliere, Tindall and Cox, London. Second Edition, 1957. Pp. xii + 376. Price 80s.

The industrial hygienist will find Dr. Fairhall's book a necessity. Any attempt to compile a completely up-to-date and comprehensive reference tool about the toxic chemicals encountered in industry must appear Utopian today, but the author has come remarkably near an impossible achievement.

The text divides naturally into inorganic substances (from aluminium to zirconium), including mineral fibres and dusts, and carbon compounds (from acetaldehyde to xylidine). Each individual monograph treats of characteristics, uses, toxicity and analysis under these respective headings, and is rounded off with a full list of references. Among the data given under Characteristics appear physical constants, explosive limits, and details of derivatives useful for identification. Under the heading of Toxicity come the symptoms of intoxication and some brief relevant case-histories. Indications of the treatment required are rarely given, the author leaving details to be filled in by the clinical toxicologist. Analytical methods are briefly indicated in principle, practical applications being left to the specialist at the laboratory bench.

A welcome feature is the appendix, which comprises four tables of essential data. The first is a conversion table relating parts per million of gases to milligrammes per litre. Table II, which gives a list of urinary metabolites resulting from the absorption and detoxication of 73 different compounds, is unique. The estimation of such metabolites offers a relatively simple means of estimating the degree of exposure of a worker, and a comparison with normal values may sometimes lead to the detection of mild intoxication before the toxic symptoms themselves become prominent. Table III, of threshold limit values for gases and vapours, dusts, fumes and mists, adopted by the American Conference of Governmental Hygienists in 1956, is reprinted from *Arch. Industr. Hlth.*, 1955, **11**, 521–524.

The fourth table lists the oral median dose (LD_{50}) lethal to rats of 104 substances, and relates them to a scale of four degrees of toxicity for simple comparison. It should be pointed out here that there is no close agreement of the I–IV scale with the alternative 6-point scale (1–6) often used for comparing toxic substances. It roughly covers the four middle divisions of the 6-point scale, the two extreme categories being rather inappropriate where industrial chemicals are concerned.

Not the least important and interesting part of Dr. Fairhall's book lies in his introductory chapter. Here he reviews the problems involved in evaluating aerial contaminants with respect to the degree of exposure of workers at different stations performing different duties. He discusses the complexity of the relationship between chemical constitution and physiological activity, revealing some of the anomalies and discouraging any superficial speculation regarding the probable toxic properties of a new industrial compound, based on the known toxicity of its congeners. Under the heading of 'experimental toxicology', the author describes the principles involved in animal experiments, and in toxicological analysis, and hints at some of the detoxication mechanisms by which the animal organism protects itself.

The alphabetical layout of this book makes for easy and rapid reference, and renders the index almost superfluous. The headings are bold, and the type and unglazed paper make for effortless reading. The binding is elegant, and is robust enough to survive years of normal handling in the laboratory. Publishers and author are to be complimented upon an outstanding contribution to toxicology.

PETER COOPER

Chemistry of Reductones

CHEMIE UND BIOCHEMIE DER REDUKTONE UND REDUKTONATE. By *H. von Euler* and *B. Eistert*. Ferdinand Enke Verlag, Stuttgart. 1957. Pp. xi + 344. DM47.40.

Reductone, one of the substances responsible for the powerful reducing action of alkali-treated glucose solutions, was isolated by Professor von Euler in 1933 and shown to be 2:3-dihydroxyacrolein. In the same year the structure of vitamin C was elucidated in Birmingham by Hirst, and it was recognised that the strong reducing character of both of these compounds is due to the 'ene-diol system' [—C(OH) = C(OH)—]. In recent years the number of compounds containing this system has been steadily increasing and the term 'reductone' has been extended to cover all such substances, as well as certain related derivatives.

The family of the reductones now includes a wide variety of acyclic, alicyclic, heterocyclic and aromatic compounds among its members, many of which pose interesting structural and mechanistic problems while others have considerable biochemical significance. A survey of the widely scattered literature on these substances is therefore most welcome.

The opening chapter of this monograph discusses the detection and estimation of reductones, and emphasises the distinction between the '*aci*-reductones', which reduce iodine and indophenol dyes in acid as well as alkaline solutions, and the 'reductonates', which show reducing character in alkaline solutions but isomerise to α-ketols under acid conditions. The reductonates are then discussed in a single chapter, the remainder of the book being devoted to the *aci*-reductones, in which the ene-diol system is stabilised by conjugation with an electron-attracting group.

Triose-reductone, the original reductone isolated by von Euler and the simplest of the *aci*-reductones, has been much investigated during the last decade and the authors give an excellent survey of this work in which they have played a leading part. The chapter on the formation of reductones from sugars is less satisfactory and it is surprising that no mention is made of the important work which has been done in the British Rayon Research Association laboratories on the degradation of sugars to saccharinic acids; the diketone intermediates in these degradations are likely oxidants in the formation of triose-reductone from sugars.

Ascorbic acid is the most familiar of the *aci*-reductones and a whole chapter is devoted to the discussion of this compound and its derivatives and analogues. The lesser-known *aci*-reductones are also surveyed in detail and the chapter on these diverse compounds is probably the most interesting in the book. Aromatic reductones, vinylogues of ene-diols, and amino- and thio-analogues of reductones are also discussed.

The final chapter deals with the biochemistry of reductones, the main emphasis being on ascorbic acid. This chapter is rather disappointing; the view that sugars are built up in nature from formaldehyde is surely a little old-fashioned.

Apart from this lapse, the book is thoroughly up-to-date, many references to unpublished work and to papers published in 1957 being included. The earlier literature has clearly been most carefully scanned for references to reductones and, except in a few isolated sections, the resulting material is well organised and bears the mark of a critical approach. Modern theoretical concepts have been used to illuminate some of the complexities of reductone chemistry and the theoretical discussion of enolisation is particularly stimulating.

One criticism must be made; it is pointless to give R_F values without quoting the solvent in which they are determined. However, the virtues of this book far outweigh any shortcomings. It provides an invaluable key to the literature of reductone chemistry, much of which is published in relatively inaccessible journals, and it is strongly recommended to chemists and biochemists who encounter reductones or compounds containing a potential ene-diol group.

PETER SCHWARZ

Plant Growth Substances

METHODEN ZUR BESTIMMUNG PFLANZLICHER WUCHSSTOFFE. By *H. Linser* and *O. Klermayer*. Springer-Verlag, Vienna. 1957. Pp. vii + 181. Price 56s.

In recent years the plant growth substances have been treated in several general textbooks; in addition they have formed the basis of a number of symposia subsequently published. To gain general welcome and

recognition, any new publication in this field must either present a new outlook or deal with some important aspect of the subject, previously neglected. This new book scores by filling the second of these criteria, since it provides the first comprehensive account of methods involved in the extraction, separation and estimation of plant growth substances. The section on their biological assay is particularly detailed and includes descriptions of 17 curvature, 14 extension growth, and 10 root growth methods of estimation. It is true that in places the book looks rather like an extended version of the chapter on growth substances appearing in another Springer publication ('Modern methods in plant analysis', Vol. III, 1955), but the new book has space to describe many methods, both chemical and biological, that find no place in the earlier publication.

While the book is comprehensive, it is also concise and to the point. For this, the authors are to be congratulated, for the temptation to digress and consider the physiology and biochemistry of the growth substances must have ever been present. Instead, they have produced an excellent laboratory manual, adequately illustrated. The published price, however, seems rather high.

L. FOWDEN

METHOD FOR MICRO DETERMINATIONS

MICRODIFFUSION ANALYSIS AND VOLUMETRIC ERROR. By *Edward J. Conway*. 4th Edition. Crosby, Lockwood and Son Ltd., London, 1957. Pp. 465. 42s.

This is the fourth edition by Professor Conway of his now classic text, first published in 1939. The microdiffusion technique in general is the simplest possible consistent with the maximum attainable accuracy in the handling of micro volumes. It was first developed for the determination of ammonia and urea, but as is described in the text the method has subsequently been applied for a variety of micro determinations.

Part 1 of the text describes the simple apparatus and principles used in microdiffusion analysis and part 2 deals with the application of the method to a variety of compounds using the standard apparatus. By this method it is possible to determine volatile bases, ammonia and amines, volatile acids such as carbon dioxide, fatty acids, volatile ketones, halogens and carbon monoxide. The third section deals with the error in volumetric titration.

The new edition is considerably expanded and contains the procedure for determination of a whole range of compounds not previously dealt with. Included is a section on the application of the ammonia method to studies in hepatic disease. New determinations described are, glutamine, histaminase, formaldehyde, acetaldehyde, together with some rapid clinical determinations.

Procedures for the various determinations are well set out and each determination is annotated with useful information. Professor Conway's book must be considered essential for all workers engaged in clinical laboratory and biochemical work.

K. R. REES

Chemist's Bookshelf

World Fertiliser Trends

RECENT DEVELOPMENTS OF THE WORLD FERTILISER MARKET. By *D. Ursula Ewald*. Institut fur Weltwirtschaft an der Universitat Kiel. 1957. Pp. 227.

Dr. Ursula Ewald of the University of Kiel has produced a remarkably good statistical study of *current* world fertiliser market trends. It may be likened to FAO annual studies but with these differences—the text accompanying the statistical data is more enterprising, and attempts are made to give tonnage figures for USSR, China, and other communist countries. Happily, the monograph has been made available in an English version.

Tendencies for large producing countries to develop surplus tonnages are discerned. This might be called the major conclusion reached by Dr. Ewald, but it can be subdivided into a number of components. The last 15 years has been the most active period in the history of fertilisers—and in nearly every country the fertiliser ratio, N—P—K, has moved sharply to the benefit of N. This much altered situation has brought these big changes in world trade for fertilisers:

(1) Western Europe, the traditional exporting area, has retained the lead as consumer, producer, and exporter, *but its share in world trade has receded*, principally through gains made by the US and the Far East.

(2) N and K exports from individual Western European countries have risen steadily since 1951, but an increasing proportion of exports goes to non-European areas.

(3) Imports from Western Europe have considerably increased in Eastern Asian countries, and this has more than offset the fall in export sales to US.

Further points made are that:

(4) Japanese and US firms are already powerfully threatening Western Europe's export trade in the Far East, and the danger would have been much larger *but for the US embargo on trade with China*.

(5) However, most of US exports to Asian countries have been made under the Foreign-Aid programme, and any reductions or cessations in this aid could lead to declines in this US-Asian trade, with US surpluses seeking their more natural markets in the American continent.

(6) The Far East market in recent years has markedly increased imports of nitrogen, but this development is not heavily based upon Aid Programmes, being more determined by genuine rises in demand, notably in China; indeed, Far East imports have contributed decisively towards absorbing surpluses. China's rising demand is likely to continue; her plans to produce more fertiliser, though substantial, are much smaller than her plans to use more.

(7) The USSR has become one of the world's biggest producers and users, but even now fertilisers can be supplied adequately for some main crops only. Substantial expansions in production are being made and already improving the supply position.

(8) Eastern European (Iron Curtain) countries are aiming simultaneously at self-sufficiency and big rises in usage; production plans also aim at having export surpluses to sell to the West. So far, plans have been inadequately fulfilled, but nevertheless the chemical fertiliser industries of these countries have been remarkably stimulated. Eastern Germany has regained pre-war levels for potash production and consumption, but efforts to export nitrogen and potash have been harmful. Inadequate investment and manpower make it unlikely that there will be large increases in Eastern German potash production in the near future.

The foregoing points apply almost wholly to nitrogenous and potassic fertilisers. The phosphate world market has changed much less in the modern period of active development. Western Europe's exports—even compared with pre-1939 data—have changed little. The world's increase in demand has mainly been met by non-European countries with export surpluses or by new or enlarged production facilities within the import areas. Western Europe's international trade for phosphates has been essentially limited to areas within Europe, and much of this trade would be small but for *basic slag*, which is made in only a few countries but used in most.

What might be looked upon as a 'stop-press' point in the German study is a reference to the stagnation in US home market sales in 1955–56, which has led since to the accumulation of large stocks of nitrogen, with resultant falls in price. Outlets abroad for this nitrogen surplus are not being found.

This exceptional study or monograph is based upon statistics for the period up to 1955 or 1955–56, but the conclusions reached reflect trends since that date with high accuracy. The British fertiliser trade should study this document very thoroughly; an analysis in *The Observer* (8 December) of the chemical industry's prospects in a European Free Trade Area contained this comment—'fertiliser manufacturers, with no apparent natural advantages, are likely to lose part of their home markets without making any compensating gain in exports.'

Introduction to Biochemical Techniques

EXPERIMENTS IN BIOCHEMICAL RESEARCH TECHNIQUES. By *R. W. Cowgill and A. B. Pardee*. John Wiley and Sons, New York; Chapman and Hall, London. Pp. 183. 28s.

This book contains a series of experiments which form the main part of the practical biochemical course of the University of California (Berkeley). It is a course for graduate students who are receiving an introduction to biochemical techniques. The experiments described fall into three main groups, physical chemical methods for separation and identification of biologically important compounds, biochemistry of enzymes and

radioactive isotope tracer techniques in biochemical research.

As in the case with many practical books, some supervision for the individual without biochemical training would seem essential in order to carry out some of the experiments. In particular this applies to the physical methods with their more involved apparatus.

Nearly all the biochemical techniques in current use are dealt with in the text, such as chromatography, electrophoresis, enzymological techniques ranging from the isolation of enzymes to methods for assaying them in tissues. This book could prove useful if one wished to apply one of the described methods in that it is of great advantage when trying out a method to have a protocol of an experiment that is known to give a positive result. The text has been well prepared and as each experiment is well referenced, the book as a whole serves as a key to modern biochemical research techniques. It should prove useful to the worker without biochemical training who wishes to apply biochemical methods to his problem.

K. R. REES.

Application of Quantum Mechanics

EXCITED STATES IN CHEMISTRY AND BIOLOGY. By *C. Reid*. Butterworths Scientific Publications, London, 1957. Pp. ix + 215. 45s.

Modern chemical theory has evolved mainly through the successful application of quantum mechanics to the problems of molecular structure and molecular excitation. Noteworthy among its achievements has been the development of a quantitative approach to the study of the detailed mechanisms and energetics of chemical reactions. As yet, precise calculations can be made only for rather simple systems, but the quantum mechanical model can, nevertheless, often be used to advantage in the interpretation of quite complex systems. The time has now come when even biological processes may be clarified by quantum mechanical thinking.

This book aims at equipping the biologist, as well as the chemist, to indulge in this activity. It provides a very adequate simple introduction to the more important principles and concepts of quantum theory and quantum mechanics and illustrates the value of these in suitable chemical and biochemical situations. The exposition is about as free from ambiguities as any elementary exposition of a difficult subject can be.

The following, which indicate the scope of the book, are among the sub-headings of the nine chapters: The wave-mechanical approach, Heitler—London and LCAO theory, atomic and molecular spectra; n—π—transitions; excitation mechanisms and radiationless transitions; the triplet state and chemical reactions proceeding via the triplet state; inter- and intramolecular energy transfer; luminescent reactions; vision and mode of action of the photopigments; the effects of high energy radiation. There are four mathematical appendixes.

The book is well produced and the price is not exorbitant.

H. MACKLE

Tropical Products Laboratories Start Move to New London HQ

FIRST laboratory of the Tropical Products Institute, that for paper-making, has already moved into the institute's new headquarters at 56–62 Gray's Inn Road, London WC1. The remainder of the laboratories and offices will be moved between now and the end of the year.

The move represents the first major removal from the Imperial Institute Building, scheduled for demolition. The TPI laboratories there were installed more than 60 years ago and have been devoted to the service of British Commonwealth and in recent times more particularly the colonial territories.

At the same time, the name of the organisation has been changed from Colonial Products Laboratory in anticipation of its function broadening again to that of assisting and advising territories in tropical and sub-tropical regions which are not necessarily colonies, bearing in mind those that have acquired independence within the Commonwealth.

Eight self-contained laboratories in the new building will be devoted to advisory and investigational work on the main groups of plant and animal products of the tropics, including the paper-making laboratory and six others which will conduct rather more fundamental research on topics related to tropical and sub-tropical areas. Another six laboratories will provide general supporting facilities such as the physical chemistry suite of rooms, chromatography, sample grinding, etc. There is also to be a pilot plant laboratory and a workshop.

The laboratories will provide working space for the 75 workers that will be employed when the TPI reaches full complement. Some bench space will be devoted to training overseas students and other visiting workers.

The unique library of 150,000 books on tropical plant and animal products and agriculture and production of the Commonwealth will be housed in two large rooms, one of which will be open to the public between 10 a.m. and 5 p.m. from Mondays to Fridays.

ICI Apprentice School Opened

Last week Sir Edward Boyle, Parliamentary Secretary to the Minister of Education, opened the engineering apprentice school recently built by Imperial Chemical Industries Ltd. at their Billingham works.

Matthew Hall Group Hold two Exhibitions

THE wide range of contract and other work both in chemical and petroleum plant and civil engineering was shown by the Matthew Hall group of companies at their annual cocktail parties and exhibitions held in London at the Dorchester Hotel on 3 December and the Piccadilly Hotel on 9 December. On both occasions, guests were received by Mr. Bertram Baden, chairman of the group.

On the chemical plant side, visitors saw an architectural model of the £5 million plant now being constructed at Fawley for International Synthetic Rubber by Matthew Hall as sub-contractors to Blaw Knox. Photographs were used to depict the group's work in carrying out the design, procurement, construction and commissioning of large chemical, oil and other engineering projects. They also showed how the chemical engineers do much of their design work with the aid of models. One such model showed the lay-out of a new chlorine plant built for Associated Ethyl.

The group's contribution to nuclear power was also demonstrated and it was stated that Matthew Hall, who are not a member of one of the large nuclear groups, have taken part in every major atomic power project in the UK. Sprinkler installations and allied fire protection equipment were illustrated and attracted attention.

Most Advanced Gas Integrale System

THE KENSAL GREEN gasworks, London, may be regarded as the most advanced of the Gas Integrale designs, it was stated in a paper given before the 23rd autumn research meeting of the Institution of Gas Engineers on 19 and 20 November.

Several systems for the complete gasification of coal, involving a carbonising retort superimposed on a water gas generator, had developed from the original work of Strache in Vienna. This process found little application in the UK while carbonisation coals were available at a economic price, but the ability to gasify coals outside the carbonisation range was of great interest at the present time.

The gas generated had a calorific value of about 340 BThU per cu. ft., so that less oil was required for carburetting to 500 BThU per cu. ft. than for water gas made from coke.

Early complete gasification systems suffered from low output per unit of plant, but extensive development had taken place until the gasification rate per unit area of grate was about half of that from a modern high-capacity water gas plant.

Woodall-Duckham Construction Co. Ltd., acquired the rights of the Gas Integrale system from the GI group of companies and the installation at Kensal Green was a joint enterprise of the company and the North Thames Gas Board. In locating the plant at Kensal Green it was envisaged that it would eventually replace six hand-operated one million cu. ft. a day carburetted water gas sets.

EQUIPMENT REVIEW

Chemical Plant: Laboratory Apparatus: Safety and Anti-Corrosion Products

HIGH TEMPERATURE COATING CORROSION LTD., 16 Gloucester Place, London, W1, have introduced Glostack, a new high-temperature coating designed for the protection from rust of steel chimney stacks, furnace doors and other steelwork subjected to high operational temperatures.

It is a metal coating supplied in liquid form, and is applied by normal paint techniques without the need of any hardener, accelerator or curing agent. The surface to be protected is suitably prepared, and then Glostack is brushed on to the cool surface. The coating article may be put back into service as soon as the coating is touch dry, which takes about 2 hours.

The company state that experience during development has proved that Glostack coating will stand up to temperatures well over 800°F for long periods. It is also stable and unharmed by a wide range of temperatures from normal atmospheric temperatures to the upper limit quoted above.

Glostack coating is resistant to weathering, and will withstand attack by chemical fumes of the kinds normally found in the vicinity of gasworks, electricity power stations, chemical works, etc. It is now in production and delivery can be made from stock. It is sold by weight in 6 and 12 lb. cans.

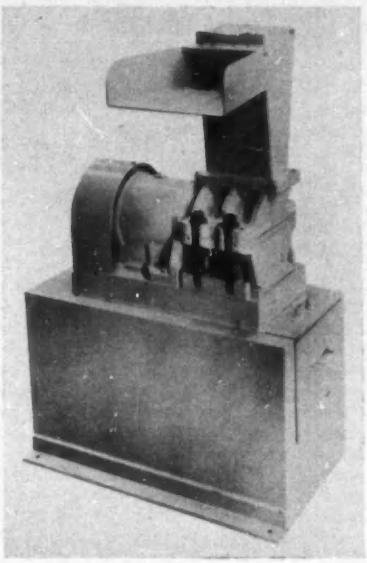
MOULDED PVC FANS STURTEVANT ENGINEERING CO. LTD. in conjunction with Acalor (1948) Ltd. of Kelvin Way, Crawley, Sussex, have produced a range of moulded p.v.c. fans based on their original 'Monogram' series. These fans, designed particularly to meet



P.v.c. fan

the ever growing need for exhausting corrosive fumes, have moulded casings and fully moulded p.v.c. impeller, permitting high operating speeds and efficiencies. Two sizes are now available with larger sizes coming forward shortly.

PLASTICS GRANULATORS AND DICERS BURTONWOOD ENGINEERING CO., of Warrington, and The Hyde, Edgware Road, London NW9, have introduced new models of their range of dicing and granulating machines. The US Cumberland stair-



Burtonwood-Cumberland model O granulating machine

step method of dicing plastics sheet stock is used in two machines, taking 7 and 14 inches respectively. The company state that by this method perfect cubes can be cut from one shearing. By changing knives from $\frac{1}{16}$ to $\frac{1}{2}$ inch cubes and rectangular pellets can be produced. The machine can handle the full range of plastics, including polythene, vinyl acetate and nylon.

Burtonwood also make two models of granulators, the Half and the Twenty. The Half is designed to operate next to individual injection moulding machines and it has two stationary and three rotating 7½ in. knives. The Twenty is for tougher matter and can handle extruder waste and die cores, sheeting mill waste, injection milling machine nozzle spewings and rough solid pieces of plastics waste of many types.

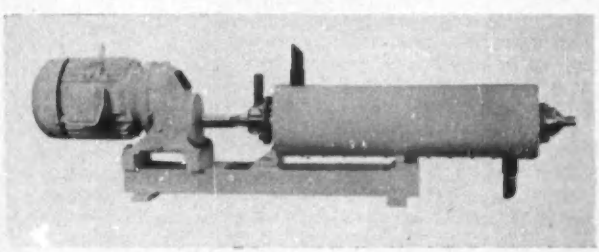
FOXBORO COMPUTING RELAYS A RANGE of Consotrol computing relays, based upon the M/58 Consotrol controller design, has been introduced by Foxboro-Yoxall Ltd., Lombard Road, London SW19. The arithmetical operations performed by the new relays are intended to extend the scope and flexibility of measurement and control systems. The seven relays, are of the force balance type, and normally operate in the range of 3–15 p.s.i. for input and output signals. Six of the relays are individually capable of such operations as adding, subtracting, multiplying and dividing, while the seventh is a general purpose or universal relay which can be made to perform any of these operations.

The universal relay employs a floating disc to act as the flapper of a conventional flapper/nozzle error sensing system. Upward forces from pressure in a group of four bellows units determines the position of the floating disc in relation to the nozzle. As the motion of the disc, relative to the nozzle, is less than a half-thousandth of an inch, it is maintained essentially in a fixed position by automatic adjustment of the pressure in the feed-back bellows. This bellows creates a force equal to the net force of three input bellows. A change of pressure in any of these three results in a change of pressure in the feed-back bellows and hence the output pressure, to maintain the balance position of the floating disc.

CONTINUOUS ROTARY PROCESSER INTRODUCED by Clarke-Built, Power Road, London, W4, is the Rota-Pro, a continuous rotary processer designed to meet the need for a heat exchanger in which viscous liquids, and those containing a high proportion of undissolved solids, can be processed well above their normal boiling points or below 0°C.

The machine is a rotary, scraped-surface heat exchanger and consists basically of a processing cylinder which is fabricated from non-corrosive metal and faced with hard chrome internally, then honed to a mirror surface. The cylinder contains a rotating mutator shaft fitted with two scraper blades of hardened stainless steel. The shaft normally revolves at a fixed speed, selected for the particular liquid to be treated. The processing cylinder is surrounded by a jacket for the heating or cooling medium; this in turn is heavily insulated and sheathed with stainless steel.

The processing cylinders are made in

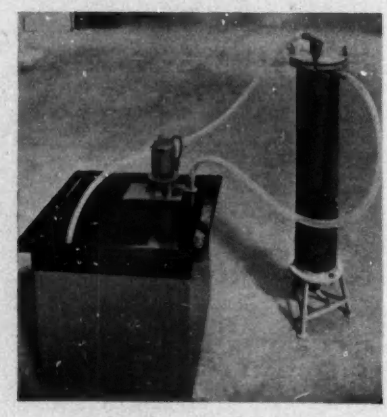


Junior Rota-Pro continuous rotary processer by Clarke-Built

two standard diameters, 4 in. and 6 in. The mutator shafts have mean diameters approximately 1 in. less to provide a relatively narrow annular space for the flow of product. The scraper blades are in intimate contact with the inner surface of the cylinder continually scraping it clean of any film or deposit, thus maintaining a high efficiency of heat transfer.

The jacket surrounding the processing tube can be arranged for high pressure steam heating, liquid heating or cooling, or direct expansion cooling by ammonia.

NON-CORROSIVE FILTER UNIT A PLASTICS pump and filter unit for the filtration of electro-plating solutions is now being manufactured by Rediweld Ltd., Crawley, Sussex. The plant consists of a submersible centrifugal p.v.c. pump, which



Rediweld pump and filter unit

is portable and can be inserted into the plating bath. The pump operates in conjunction with a p.v.c. filter, fitted with a bag made from Redivin p.v.c. filter cloth. The bag is supported by a cylinder made from expanded polythene to prevent collapse during filtration.

Connections between the pump and the filter unit are of flexible crystal-clear Pliovyn tubing, and the pump is directly driven by a vertically fitted electric ½ h.p. 1,500 r.p.m. three-phase motor.

REFRACTORY PROTECTIVE COATINGS COLTRATE LTD., of New Broad Street House, 35 New Broad Street, London, EC2, have introduced a new range of refractory protective coatings known as Coltrate RPC. There are several types of Coltrate RPC to deal with varying conditions. They are all supplied in the form of a dry powder, which for use is mixed with water to a thick creamy paste and applied by brushing, spraying or trowelling. The coating thickness is from 1/16th to ¼-in. After application, the furnace is fired and the temperature steadily increased up to the point where vitrification is reached.

The coating, after fusing, remains as a strong, adherent one piece lining that prevents cracking of the underlying refractories. The coating also penetrates and seals the pores of the refractories, and forms a barrier to gases and particles, and acts as a binder for loose particles and cracked portions. The complete range of Coltrate RPC (glazed types) covers the following temperature ranges: Loglaze 1521—1,500° to 2,100°F; Midglaze 1823—1,800° to 2,300°F; Higlaze 2230—2,200° to 3,000°F.

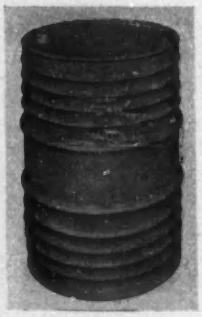
A non-vitreous type—Nonvit—is also available, and this covers the complete temperature range from 50° to 3,500°F, and also a refractory mortar for bonding, patching and plugging, designed to be effective over the temperature range up to 3,000°F.

WOOD LAMINATE FLOORING Now available in this country is a laminated wood flooring called Permadec, a material developed on the Continent. It is manufactured and sold in the UK by Permali Ltd., Bristol Road, Gloucester, and is designed for applications requiring a hard-wearing plastics material that retains the appearance of natural wood. The top side of each sheet has a grooved or chequer plate surface. The material is made by impregnating beech wood veneers with phenol formaldehyde resins which are then hydraulically compressed into a homogeneous sheet. The flooring is said to be simple to lay, easy to maintain and economical to use.

Among suggested uses is decking in chemical plant where corrosion problems are acute. Advantages claimed are non-absorption of oil; resistance to salt water, battery acid, etc. Various thicknesses are available from ¼ in. upwards and the standard size sheet measures 5 ft. by 3ft. Alternatively it can be cut to the most economical size.

REINFORCED STEEL DRUM SOLIDRUM, a new type of steel drum with 'built-in' strength, is now being produced by London Containers and Noakes Ltd., Butchers Road, London E16. The Solidrum, made in a 40 and 45 gall. capacity, to the new standard diameter of 22½in., has reinforced bands machined into the end seams and two heavy gauge butt-welded hoops reinforcing the inside of the rolling hoops. The company consider that these are the parts of the steel drum that are most vulnerable to damage.

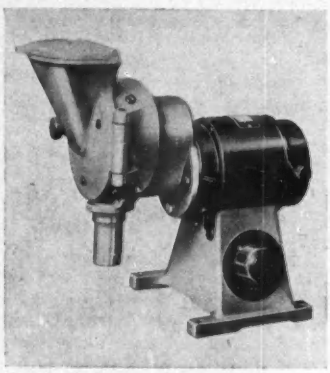
With a patented machine, developed on the Continent, they build-in the reinforcing during manufacture of the drum, making the end seams .35 in. thick. The added strength at these places permits the use of a lighter gauge of steel sheet throughout the drum than would otherwise be possible, and the company state that the price of their product is between 7 and 10 per cent lower than would be the case if heavier gauge material had been used throughout.



Solidrum which has built-in reinforcements for greater strength

The Solidrum also has a series of eight deep pressed-out corrugations formed at the top and bottom, between the rolling hoops and the end seams. These give even greater rigidity to the drum body and like the other reinforcements are part of the drum and are said to be unaffected by rough handling.

MICRO HAMMER MILL THE new micro hammer mill has been designed by Glen Creston Ltd., 41 Church Road, Stanmore, Middlesex, to reduce the particle size of small samples to a degree required for analytical work. Its dimensions and construction are aimed at making the crushing, recovery of the ground product and subsequent cleaning of the mill as simple and speedy as possible.



New micro hammer mill

It is claimed that within 30 to 120 seconds, samples are pounded to powder by three freely swinging stainless-steel hammers, the crushed particles passing through an interchangeable screen into a transparent plastics tube of 35 c.c. capacity. Particle size can be adjusted by quickly interchangeable screens with mesh of various diameters. Extra fine screens of 0.7 and 0.5 mm. mesh diameter are available as an extra. Price, with 100-watt motor, built-in variable resistance, three interchangeable screens with mesh diameters of 1, 1.5 and 2 mm., and stand with 12 tubes of 35 c.c. capacity and cleaning utensils, is £54.

Glaxo's New Polio Vaccine Production Unit

Two extensions to Glaxo Laboratories' poliomyelitis vaccine production unit at Sefton Park, Stoke Poges, Bucks were completed last month at the cost of £150,000. It is hoped that the extra plant capacity will raise the production of Polivirin, the Glaxo vaccine, by 50 per cent by early summer.

PEOPLE in the news

● DR. KENNETH PANKHURST is leaving his present post with the British Leather Manufacturers' Research Association to take up a position as a section head in the new packaging research and development division of Albert E. Reed and Co. Ltd., at Aylesford, Kent. He will be working under DR. G. L. RIDDELL who recently left the Printing, Packaging and Allied Trades Research Association to join Reed's. Dr. Pankhurst has been with BLMRA since 1945 and for the past year has been a senior principal scientific officer.

● DR. J. H. PRYOR, B.Sc., Ph.D., F.R.I.C., recently elected vice-chairman of the London section, Royal Institute of Chemistry, is assistant professor of chemistry, Royal Naval College, Greenwich. Other officers elected were: hon. secretary, DR. S. A. MILLER, manager, basic research department, British Oxygen Research and Development Ltd.; hon. assistant secretary, G. C. ACKROYD; hon. treasurer, P. F. CORBETT; hon. auditors, DR. H. G. SMITH, A. H. THORNELOE; hon. almoner, D. M. FREELAND. Elected to the committee were: DR. H. I. STONEHILL, G. H. EDWARDS, H. W. HODGSON, F. C. HYMAS, ALWYN JONES, N. WYN ROBERTS, R. SAWYER and A. J. TURNBULL, past hon. secretary. MR. W. H. BENNETT was nominated by the committee to fill an extra vacancy. Chairman of the section is DR. C. C. HALL, DSIR Fuel Research Station.

● PROFESSOR N. K. ADAM, formerly head of the department of chemistry, Southampton University, has had the title of emeritus professor conferred on him by the university council.

● MR. P. HIGHAM, scholar of Lincoln College, Oxford, has been awarded the Gibbs scholarship in chemistry.

● MR. J. G. NOTMAN, president of Canadair Ltd, a subsidiary of General Dynamics Corporation, has joined the boards of Liquid Carbonic Canadian Corporation Ltd and Imperial Oxygen Ltd, also subsidiaries of General Dynamics. MR. KEITH W. SHAW, MR. JOHN C. WADDELL, and MR. A. CHIFERZAK, have been appointed vice-presidents of Liquid Carbonic and Imperial Oxygen.

● MR. H. C. PRITCHARD has been appointed managing director of Cambridge Instrument Co. in the place of MR. W. H. APTHORPE, who is to retire at the end of the year. At present Mr. Pritchard holds a senior position with Elliott Bros. After graduating from Oxford, he went to the Air Ministry on research and development work and in 1939 was appointed head of the Navy section at the RAE, followed by other air appointments. Mr. Pritchard was seconded to the Australian Government in 1949 as chief superintendent of the Woomera Rocket Range, returning to this country to join Elliott Bros.



H. C. Pritchard, who is leaving Elliott Bros. to become managing director of Cambridge Instruments

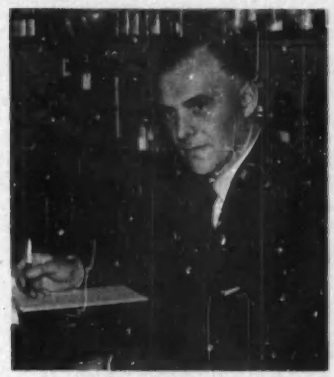
● Officers of the British Colour Makers' Association elected at the recent annual meeting were: *chairman*, V. WATSON (Cromford Colour Co.); *vice-chairman*, G E HILLIER (J. W. and T. A. Smith); *hon. treasurer*, C. G. A. COWAN (Cowan Bros. (Stratford), Ltd.); *council*, C. M. BEAVIS (Golden Valley Colours, Ltd.), A. S. CALLAGHAN (ICI dyestuffs division), C. G. A. COWAN, G. E. HILLIER, H. GOSLING (Cornbrook Chemical Co.), J. H. GRIMSHAW (Horace Cory and Co.), H. PIKE (Hull and Liverpool Red Oxide Co.), V. WATSON, A. H. WHITAKER (James Anderson and Co. (Colours) Ltd.); *secretary*, ALLAN J. HOLDEN.

● SIR MILES THOMAS, chairman of Monsanto Chemicals Ltd., is the new deputy chairman of the British Productivity Council. He succeeds MR. LEWIS T. WRIGHT, who has been elected chairman of the Council.

● The Ministry of Agriculture, Fisheries and Food's director of fishery research, MR. G. M. GRAHAM, will retire on 21 February. The present deputy director, MR. R. S. WIMPENNY, will succeed Mr. Graham. The new deputy director will be DR. H. A. COLE.

● MR. P. W. MICHELSON, formerly sales manager of Extrudex Ltd., has been appointed a director of Cawley Plastics Ltd., Weybridge, Surrey, a specialist fabrication company which intends to carry out precision fabrication in both thermoplastics and glass-fibre laminates.

● DR. T. S. WEST, B.Sc., Ph.D., A.R.I.C., author of a new monthly series of articles on recent trends in analytical chemistry (page 973), was this year awarded the Meldola Medal, Royal Institute of Chemistry, for researches into analytical chemistry. He gave the Meldola lecture on Tuesday this week on 'Some recent developments in organic and inorganic analytical chemistry'. Aged 30, Dr. West was educated at Tarbat Old Public School and Tain Royal Academy, where in 1945 he took first place in the Highlands and Islands Bursary Competition. He matriculated at Aberdeen University and in 1949 he obtained 1st class hons. B.Sc. in chemistry. He then moved to the research school of Birmingham University to study for a Ph.D. in analytical chemistry under DR. R. BELCHER on a research grant from Monsanto Chemicals. He obtained his doctorship in 1952 and was awarded a senior DSIR fellowship for research into development of a system of ultimate organic ultramicroanalysis. In 1955 he was appointed lecturer in chemistry at Birmingham. He has published more than 30 research papers and is part author of two books. His wife is an Aberdeen graduate in maths-physics.



Dr. West in the Birmingham University chemistry laboratories

Gallenkamp at Two Canadian Exhibitions

Two recent exhibitions of laboratory equipment in Canada featured a representative range of scientific apparatus, instruments and glassware by A. Gallenkamp and Co. Ltd., 17–29 Sun Street, Finsbury Square, London EC2. The exhibitions were held in Toronto and Montreal by Canadian Laboratory Supplies Ltd., Gallenkamp's exclusive agents. Mr. A. W. A. Rundle, managing director and Mr. G. F. Adams, technical director, flew to Canada to attend the two shows.

Canadian scientists were able to see the products of about 40 manufacturers from the US and Europe. Also showing from the UK were Electrothermal Engineering Ltd. Gallenkamp report successful results from the exhibitions, particular interest being shown in a new range of Gallenkamp ovens, complying to BS2648, and incubators, both with stainless steel retainers. Prospects for future business are said to be much improved.

Will

DR. GERALD ROCHE-LYNCH, O.B.E., M.B., B.S., F.R.I.C., F.C.G.I., of 81 Sussex Place, Bath Road, Slough, Bucks, senior official analyst to the Home Office, and director of the Department of Chemical Pathology, 1928–54, lecturer in forensic medicine at St. Mary's Hospital Medical School, 1936–54, who died on 3 July last, aged 68 years, left £43,849.

Commercial News

Staveley Turnover Expands, but Profit Margins Narrow

WHILE profit margins of Staveley Coal and Iron have again narrowed, as a result of expanding turnover, the reduction in profit ratio has been made good. The annual report shows that group profits before taxation were £1,598,759 compared with £1,745,886 in the previous year. Consolidated profit after taxation available for appropriation was £817,978.

An interim dividend of 4 per cent was paid in March last (4½ per cent). Final dividend recommended by the directors is unchanged, however, at 10½ per cent, making a total gross dividend of 14½ per cent as compared with 15 per cent for the preceding year.

In the annual report the chairman, Mr. Thomas A. McKenna, gave brief details concerning the company's subsidiaries. He announced that Beswick's Lime Works Ltd. had benefited in greater measure from the recently installed extensive mechanisation scheme.

As a result of the wet summer of 1956, Birmingham Chemical Co. Ltd. suffered a reduction in output with a consequent fall in profits. Efforts are being made to develop the company's interest in the aromatic and fine chemical fields, and so reduce its dependence on purely seasonal trade. These efforts are meeting with some success, but progress is described as slow.

Output of the British Soda Co. Ltd. has been maintained, but the company is stated to have felt the effect of continually rising costs. Profits are lower than a year ago.

Anglo-Lautaro Nitrate

No dividend is being paid by Anglo-Lautaro Nitrate Corporation in respect of the year ended 30 June last, against 80 (US) cents per A share previously. Giving this information, the chairman, Mr. H. F. Guggenheim, states that the accounts show a net profit of (US) $193,413 as compared with £4,388,149.

Earnings were seriously affected by a combination of several factors, including the loss of production and sales resulting from the strike and to the depressed price level in world nitrogen markets, which, combined with high freight rates caused by the Suez crisis reduced the net yield per ton of nitrate sales by more than 10 per cent. With regard to the future, it is stated that a number of factors in the current situation of the company afford a sound basis for encouragement.

Scottish Agricultural Industries

Due to the decline in group sales of Scottish Agricultural Industries from £24.2 million to £22.7 million, there has been a noticeable decrease in profits before tax, from £1,041,375 to £622,862, for the year ended 30 September last. The reduction in sales is stated to be largely due to substantially lower price levels of feeding stuffs and farm produce and by reduced summer deliveries of fertilisers pending full operation of the new Leith plant.

In spite of the fall in profits, however, the ordinary dividend is being maintained at 8 per cent, less tax, with an unchanged final of 5 per cent.

Chinnor Industries

Although group profits of Chinnor Industries Ltd., cement and lime manufacturers, were reduced from £126,710 to £109,553, in the year to 30 September 1957, a reduced tax charge of £15,433 (£46,784) gives an increased net profit of £94,120 as against £79,925.

The dividend is being maintained at 20 per cent, with an unchanged final of 15 per cent.

Distillers Co. Ltd.

Holders of Distillers Co. Ltd.'s £250,850 5 per cent unsecured loan stock 1964, (convertible 1952-57) have exercised their option to convert into ordinary 6s 8d shares during the period 15 October and 30 November this year, and will be issued with 250,850 ordinary shares.

Kleemann-Erinoid

Latest development in the Kleemann-Erinoid proposals is that Kleemann's have confirmed that they now propose to offer to Erinoid preference shareholders a 6½ per cent Kleemann preference instead of the 6 per cent originally announced. The offer now, therefore, for each Erinoid 4½ per cent preference is 15s nominal of a Kleemann 6½ per cent stock plus 5s cash.

Redfearn Bros.

Little encouragement is given by the chairman of Redfearn Brothers Ltd., Mr. M. Asquith, regarding an early return to more profitable trading in glass containers. Conditions in the industry are stated to have become more difficult and although the order book position is satisfactory, he states, 'it is not easy to forecast the current year or the future'. Two factors, lower margins and some reduction in turnover were responsible for the decline in profits from £196,749 to £151,439 for the year to 30 September last. Dividend was 25 (same).

Shawinigan Chemicals

J. A. Fuller, president of the Shawinigan Water and Power Company, has told shareholders that the chemical subsidiaries had good sales volume in the first nine months of this year although earnings were somewhat lower. The volume of sales of Shawinigan Chemicals, Ltd., for the first nine months was slightly higher than for the same period of 1956.

Competition in the markets for chemical products, made more severe by the high premium on the Canadian dollar, coupled with higher freight rates, higher wage levels and increased costs of materials, have caused a reduction in net earnings. In addition, a number of patents held by the company have expired, but their reduction in royalties received was partly offset by an increase in income from other sources.

Sales of many products of Canadian Resins and Chemicals in domestic markets during the period showed an encouraging increase over those in 1956, but there was a substantial reduction in export sales. However, it seemed that the full year's results would be better than last year. Sales and earnings of B. A. Shawinigan Ltd. showed further improvement and the business of St. Maurice Chemicals Ltd. was maintained. Sales of Shawinigan Products Corporation, New York, were approximately the same, but net earnings were down. Sales of Hedon Chemicals Ltd., UK manufacturers of vinyl acetate, were maintained.

Ceramic Holdings

An interim dividend of 4 per cent on a doubled capital in respect of the year ending 31 March 1958 has been declared by Ceramic Holdings. In the previous year a 5 per cent interim was paid prior to a one-for-one rights issue, followed by a 6 per cent final on the present capital.

The directors state that profits to date are considered to be satisfactory, although the full benefit of the new capital employed has still to be reflected in the results.

NEW COMPANIES

A. J. Gomiero Ltd. Cap. £5,000. Manufacturers of and dealers in chemicals, essential oils, and raw materials for the perfumery, cosmetics, soap, pharmaceutical and food flavouring and tobacco industries, etc. Director: J. Gomiero. Reg. office: 6 Cowper Street, London EC2.

Stanley Cox (Ceramics) Ltd. Cap. £100. Manufacturers of and dealers in foils and coated, treated, heat resistant and processed papers, ceramic transfers and blocking machinery, ceramic pigments, solutions, binding media, colouring matter, plant, etc. Directors: Stanley M. Cox and Stanley W. Cox, both of 10 Lynton Road, West Croydon, Surrey.

INCREASES OF CAPITAL

F. W. Berk and Co. Ltd., chemical and chemical product manufacturers, 1/19 New Oxford Street, London WC1. Increased by £520,000, in 5s shares, beyond the registered capital of £1,480,000.

H. Marcel Guest Ltd., manufacturers of capping solutions, cellulose products, chemical solvents, etc. New Era Works, Fitzgeorge Street, Manchester 9. Increased by £5,000 beyond the reg. cap. of £1,000.

RELEASE OF RECEIVER

Bede Metal and Chemical Co. Ltd. (in voluntary liquidation), Hebburn. Mr. J. M. S. Coates, 31 Mosley Street, Newcastle upon Tyne 1, ceased to act as Receiver on 11 November.

LONDON GAZETTE

Notice of Meeting

Metallo-Chemical Refining Co. Ltd., chemical, metal and ore merchants, reg. office, 53 New Broad Street, London EC2. Creditors, 17 December, 2.30 p.m.; contributories, 17 December, 12 noon; both at room 401, 346 Strand, London WC2.

Market Reports

LEAD OXIDE PRICES DOWN

LONDON Trading activity during the past week has been on a moderate scale with interest spread over most sections of the market. Contract deliveries are being taken up regularly and attention is now being given to replacement business for the first half of 1958. Caustic soda, soda ash and chlorate of soda are in good demand and supplies of the potash chemicals are finding a ready outlet.

Further price reductions in the lead oxides have been notified as from 11 December, red lead being £101 5s per ton while white lead is down to £113 5s per ton. Zinc oxides are lower with the fall in the metal, the price for 2-ton lots being white seal £93, green seal £91 and red seal £88 per ton. Elsewhere prices are steady with a firm undertone.

Among the coal-tar products pitch is an active section on home and export account while there has been a good request for creosote oil and cresylic acid for home use. Prices continue at recent levels.

MANCHESTER Pressure for supplies of the alkalis against contracts on the Manchester market have been well maintained from the cotton and woollen textile and allied industries and from most other leading users. New business is showing signs of becoming quieter with the approach of the year end. Shipping business in a wide range of chemicals continues on a reasonably good scale. The undertone of the market is generally firm. Among the fertilisers, the concentrated and compound varieties, as well as basic slag, are being called for steadily. A ready outlet is also being found for creosote oil, carbolic acid, xylol and other tar products.

GLASGOW In the Scottish heavy chemical market the past week has shown an improvement over the previous one. Business has been fairly active both in regard to the textile and heavy industries. With the approach of the end of the year, contract requirements for next year are now coming under consideration. Prices have remained firm with little or no change. The overseas market still continues favourable.

New Ampholytic Surface Active Agent

A NEWLY developed ampholytic surface active agent, Desil, has been marketed by P. R. Masek (Research Laboratories) Ltd., Stevinson House, 155 Fenchurch Street, London EC3.

Desil is a salt of N-lauryl (aminosulphonic) beta amino butyric acid. In appearance it is a clear pale amber liquid containing 50 per cent active ingredient.

The agent is fully soluble in all proportions in water and/or alcohols, to give a clear solution. The solutions are stated to have excellent detergency and are neutral and stable. They are light in colour, have no unpleasant odour, non-corrosive to metals and are not toxic or irritating to the skin at the recommended concentrations.

P. R. Masek Ltd. state that each molecule of Desil contains groups which are ionised cationically and groups which are ionised anionically, both types being present in approximately the same number so that the molecule as a whole is electronically neutral. It is compatible with anionic and cationic agents.

The product is said to have excellent penetration and in view of its ampholytic properties can be considered as a wetting agent. As a bactericide it has been found of value against a wide range of gram positive and gram negative organisms including human strains of tubercle bacilli in short periods of exposure. The Rideal Walker coefficient of a 1 per cent solution is 0·5.

Desil is said to retain its bactericidal activity at very low concentrations even in the presence of soaps, anionic surface active detergents, proteins, calcium, magnesium, ferrous and ferric ions. Hence it is suggested as a germicide for personal, medicinal and hospital disinfectation and for general purposes such as dairies, restaurants, breweries, households, etc.

In view of its ampholytic properties it is suggested as an active ingredient in ointments, soaps, barrier creams, etc.

A British patent—P.21403/57—has been applied for.

Furthur Platinum Price Reductions

FOR the second time within a few months, UK platinum refiners have reduced prices of the metal. The two head UK refiners, Baker Platinum and Johnson Matthey, have lowered their prices from £31 to £28 10s. a troy ounce. Cuts have also been announced in the US, where Baker Platinum have reduced their quotation by $7 to $77 an ounce for bulk quantities.

In July last Baker Platinum reduced its price of platinum by £3 from £34 an ounce, and Johnson Matthey made a similar cut in October.

Reason for the cuts is that the main consumer of platinum, the petroleum industry, has not been buying the metal. The situation has also been aggravated by offers of cheap Russian platinum. The platinum market is expected to improve, however, for several new refining plants now under construction will require finished platinum catalyst in the first half of next year.

The Rustenburg Platinum Mines' selling price of platinum in the US has also been reduced from $84.87 to $77.80 a troy ounce. This brings the company's price into line with Baker Platinum.

FOR YOUR DIARY

TUESDAY 17 DECEMBER

Institution of Chemical Engineers—Manchester; College of Science and Technology. 6.30 p.m. 'Gas-solid reactions' by Professor K. G. Denbigh.

WEDNESDAY 18 DECEMBER

Plastics Institute—Glasgow; Moro's Hotel. 7.30 p.m. 'Akulon—type 6 nylon' by R. van der Spek.

Oil & Colour Chemists' Association—London; Royal Society of Tropical Medicine, Manson House, 26 Portland Place W1. 7 p.m. 'Polyvinyl acetate emulsion paints; solved and unsolved problems' by L. A. O'Neill.

RIC, SAC & SCI—Newport; Technical College. 7 p.m. 'Chromatography' by Dr. F. Pollard.

Society for Analytical Chemistry—London; 'The Feathers', Tudor Street EC4. 6.30 p.m. Discussion on 'The weighing and measurement of small quantities' opened by G. F. Hodsman.

SCI Corrosion Group—London; 14 Belgrave Square SW1. 2.30 p.m. 'Teaching corrosion science'; 'Existing facilities' by L. W. Stubbs and 'Future requirements' by T. P. Hoar.

TRADE NOTES

LOTIN LTD., 61 Portland Place, London W1, have changed their name to Chemical Building Products Ltd.

NORTHERN SMELTING AND CHEMICAL CO. LTD., 9 Basinghall Street, London EC2, have changed their name to Conzinc Investments Ltd.

Change of Address

Head office of BRITISH TITAN PRODUCTS CO. LTD. is to be transferred from York to London on 1 January. The new address will be: 10 Stratton Street, W1 (Grosvenor 7822).

Titanium Oxide Prices

The figures quoted last week (p. 937) for titanium oxide prices were actually the reductions in basic selling prices made by Laporte Titanium Ltd. To clarify the matter, following are the price reductions as announced by Laporte:

Runa RH and Runa RG by £5 a ton; Tiona G., Tiona WD and Tiona S by £5 a ton; Tiona 80 by £4 a ton; Tiona 50 by £2 5s a ton; Tiona 25 by £1 5s a ton; and Tocarba 25 by £1 10s a ton.

Dispersion Coating of PTFE

Siemens Edison Swan Ltd., state that at their new factory in Tottenham, they are now equipped to coat with p.t.f.e. dispersion articles of all sizes. Newly installed plant includes sintering ovens capable of accepting parts equivalent in size to a double-decker bus, and conveyer ovens will handle large quantities of small parts. This process results in a completely inert and non-stick surface with an almost zero co-efficient of friction.

Winkel GmbH Merger

The 100-year-old R. Winkel GmbH organisation of Goetingen, which employs nearly 2,000 people specialising in standard microscopes and polarisation instruments, has been merged with the Carl Zeiss Foundation of Western Germany with which it has co-operated closely for 50 years. Henceforth it will be known as the Carl Zeiss Werk Winkel.

NEW PATENTS

By permission of the Controller, HM Stationery Office, the following extracts are reproduced from the 'Official Journal (Patents)', which is available from the Patent Office (Sale Branch), 25 Southampton Buildings, Chancery Lane, London WC2, price 3s. 3d. including postage; annual subscription £8.

Specifications filed in connection with the acceptances in the following list will be open to public inspection on the dates shown. Opposition to the grant of a patent on any of the applications listed may be lodged by filing patents form 12 at any time within the prescribed period.

AMENDED SPECIFICATIONS

On sale 15 January or as soon as possible thereafter

Preparation of inhibitors of oxidation and of related undesirable reactions. Imperial Chemical Industries, Ltd. **727 247**

Manufacture of silicone rubber. Connecticutt Hard Rubber Co. **738 042**

Pesticidal Compositions. Price, M. D. **767 748**

ACCEPTANCES

Open to public inspection on 15 January

Installations for the absorption of heat from gases generated under pressure. Babcock & Wilcox, Ltd. **789 246**

Continuous production of iron or steel in a rotary vessel. Stora Kopparbergs Bergslags Aktiebolag. **789 101**

Measuring apparatus. Foxboro Co. **789 102**

Unsaturated alcohols and a process for the manufacture thereof. Hoffmann-la Roche & Co., AG. **789 247**

Liquid-fuel atomisers. Luciani, C. **789 252**

Detergent preparations. Unilever, Ltd. **789 032**

Substituted aralkyl-phenyl-alkylamines. Naamlooze Vennootschap Philips' Gloeilampenfabrieken. **789 033**

Polymeric materials and their production. Imperial Chemical Industries, Ltd. **789 254**

Production of dyestuffs on the fibre. Farbenfabriken Bayer AG. **789 310**

Air filters. Controlled Plenum & Exhaust Plants, Ltd. **789 256**

Fuel elements for nuclear reactors. UK Atomic Energy Authority. **789 257**

Homopolymers and copolymers of unsaturated esters of epoxy fatty acids. Union Carbide Corp. **789 034**

Refining of molten ferrous metal containing carbon. Stora Kopparbergs Bergslags Aktiebolag. **789 258**

Production of ferrochromium. Bleloch, W. **789 036**

Production of organic acid esters of cellulose. Celanese Corp. **789 210**

Methods and apparatus for condensing and/or rectifying mixtures. Naamlooze Vennootschap Philips' Gloeilampenfabrieken. **789 260**

Production of alkali metal titanates. Soc. des Blancs de Zinc de La Mediterranee E. Chabaury, P. Gindre & Cie. **789 104**

Dyeing of polyacrylonitrile fibres and films. Geigy AG., J. R. **789 263**

Therapeutic products of bacterial metabolism and process for their preparation. Gratacos, M. L. **789 107**

Polysiloxanes. California Research Corp. **789 264**

Isocyanates. Du Pont de Nemours & Co., E. I. **789 265**

Oil-free unsaturated polyester resin solutions. Chemische Werke Albert **789 267**

Method of producing a compound which is capable of increasing the calcium content of the blood. Naamlooze Vennootschap Philips' Gloeilampenfabrieken. **789 269**

Hardening of epoxide resins. Chemische Werke Albert. **789 108**

Dewatering solutions of organic acid esters of cellulose. Celanese Corp. of America. **789 211**

Production of organic acid esters of cellulose. Celanese Corp. of America. **789 212**

Organosilicon compositions. Midland Silicones, Ltd. **789 112**

Production of gases rich in olefines from hydrocarbon oils. Bergwerksges Hibernia AG., and Koppers Ges., H. **789 049**

Gas-mixture fractionation apparatus. Naamlooze Vennootschap Philips' Gloeilampenfabrieken. **789 051**

Trichloro-methyl-mercaptan derivatives and production. Farbenfabriken Bayer AG. **789 273**

Polycyclic compounds. Naamlooze Vennootschap de Bataafsche Petroleum Maatschappij. **789 113**

Production of phenthiazine compounds. May & Baker, Ltd. **789 276**

Production of vitamin B_{12}. Richter Gedeon Vegyszeti Gyar R. T. **789 019**

Nickel-silicon-boron alloys. Coast Metals, Inc. **789 277**

Polyethylene composition and process of cross-linking. Hercules Powder Co. **789 116**

Curable dispersions of ethylene polymers. Du Pont de Nemours & Co., E. I. **789 055**

2, 4-diaminothiazoles containing a halogenated aryl radical in the 5-position and derivatives. Searle & Co., G. D. **789 057**

Filters for liquids. General Motors Corp. **789 280**

Alkoxyphenoxy-2-hydroxypropyl carbamates. Robins Co., Inc., A. H. **789 283**

Nuclear reactors. Stichting Reactor Centrum Nederland. **789 117**

Polyester tubes reinforced with glass fibres. Reichhold Chemie AG. **789 119**

Steroid hormones. Searle & Co., G. D. [Divided out of 789 065.] **789 066**

Vat dyestuffs of the anthraquinone series. Cassella Farbwerke Mainkur AG. **789 120**

Waxes for the production of water-free polishes. Ruhrchemie AG. [Divided out of 788 996.] **788 997**

Open to public inspection on 22 January

Process for the fluorination of organic compounds. Rosen, R. **789 441**

Production of rigid or semi-rigid liquid or paste-filled containers. Rado, L. **789 311**

Dispensing means for liquids. Woodrow, S., and Woodrow, J. S. **789 531**

Manufacture of N-alkylated acid amides. Knapsack-Griesheim AG. **789 533**

Oil-in-water emulsion textile-printing extender pastes. Auer, L. **789 534**

Preparing liquid fuels for combustion. Daimler-Benz AG. **789 444**

Basic ethers and their salts, and process for the production thereof. Eprova AG. **789 339**

Carboxy-alkyl N-substituted phenyl-carbamates and herbicidal compositions thereof. Columbia-Southern Chemical Corp. **789 445**

Thermal decomposition of a metal nitrate and products made by the said process. Nossen, E.S. **789 446**

Heterocyclic compounds. Merck & Co., Inc. **789 484**

Recovery of maleic anhydride from hot gaseous mixtures. Badische Anilin- & Soda-Fabrik AG. **789 414**

Manufacture of polyhydroxy compounds. Celanese Corp. of America. **789 346**

Surface active polymeric trimethylene oxide derivatives with polyether side-chains, and process for producing same. Farbenfabriken Bayer AG. **789 415**

Glass aerosol containers and method of making same. West, J. F. **789 347**

Means for compressing air. Soc. D'Inventions Aeronautiques et Mecaniques, S.I.A.M. **789 558**

Synthetic resins. Röhm & Haas Ges. **789 417**

Apparatus for the counter-current contacting of gases and liquids. Jacir, J. **789 640**

Unsaturated keto-esters and a process for the manufacture and conversion thereof. Hoffmann-La Roche & Co. AG., F. **789 487**

High-melting interpolyamides prepared from epsiloncaprolactam. Chemstrand Corp. **789 491**

Viscosimeters. Daimler-Benz AG. **789 354**

Lubricating grease compositions. Naamlooze Vennootschap de Bataafsche Petroleum Maatschappij. **789 421**

Producing glutamine. International Minerals & Chemical Corp. **789 424**

Serines. Parke, Davis & Co. **789 574**

Process for the preparation of a biologically active compound. Organon Laboratories, Ltd. **789 427**

Separation of acid gases from coal carbonisation gases. Koppers Co., Inc. [Addition to 785 153.] **789 495**

Pentacyclic ketone and process for making it. Ciba Ltd. **789 357**

Insecticidal compositions. Ihara Noyaku Kabushiki Kaisha. **789 358**

Process for the decomposition of titanium ore. Farbenfabriken Bayer AG. **789 497**

Alkyl-substituted hydrindacenones. Givaudan & Cie. Soc. Anon., L. **789 576**

Extraction of titanium compounds from minerals containing same. Ludekens, W. L. W. **789 499**

Derivatives of amino-thiochromanones and amino-thiochromones. Farbenfabriken Bayer AG. **789 430**

Preparation of mercury-containing fungicides, and compositions containing them. Olin Mathieson Chemical Corp. **789 432**

Waste liquid pipe-lines. Adams, B. **789 313**

Methane chlorination products. Farbwerke Hoechst AG. **789 314**

Lubrication. Imperial Chemical Industries, Ltd. [Cognate application 7 174.] **789 448**

Temperature detecting arrangements, more particularly fire detectors. Sangamo Weston, Ltd. **789 598**

Dicarboxy- and dicarbalkoxy-benzanilides and linear polyesters therefrom. Kodak, Ltd. **789 317**

Production of derivatives from aldoses or ketoses. National Research Development Corp. **789 318**

Synthetic lubricating compositions. Esso Research & Engineering Co. **789 381**

Molybdic xanthates and their use in lubricating compositions. Institut Français du Petrole des Carburants et Lubrifiants. **789 383**



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OFFICIAL APPOINTMENTS

SENIOR SCIENTIFIC OFFICERS: SCIENTIFIC OFFICERS. The Civil Service Commissioners invite applications for pensionable appointments covering a wide range of scientific research and development in most of the major fields of fundamental and applied science. In Biological subjects the number of vacancies is small: individual vacancies exist in the Natural History Museum for candidates who have special knowledge of, or who are interested in, taxonomic entomology, palaeontology.

The Royal Naval Scientific Service require a Scientific Officer (male) for the National Institute of Oceanography to work on oceanic Cephalopoda; and a vacancy for a Metallurgist (Scientific Officer) has arisen in the Royal Mint.

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Further particulars, from Civil Service Commission, Scientific Branch, 30 Old Burlington Street, London, W.1, quoting No. S.53/57 for Senior Scientific Officers and S.52/57 for Scientific Officers.

Application forms should be returned by 31st December, 1957.

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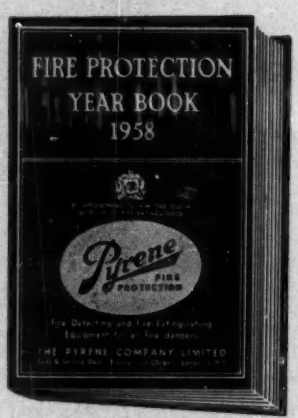
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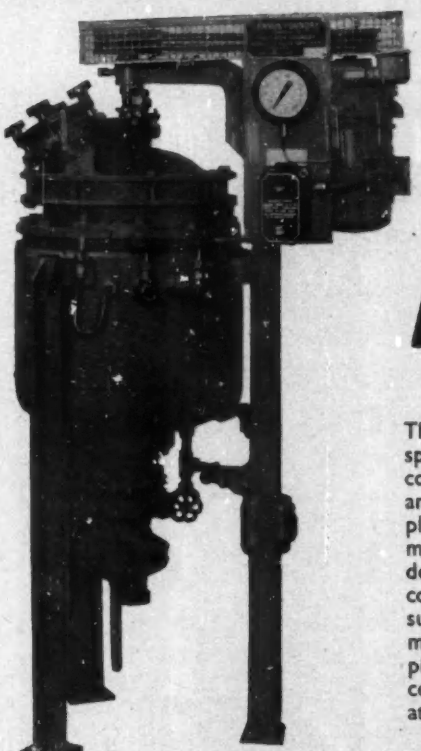
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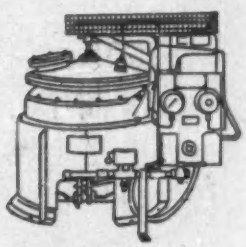


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